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FOOD TECHNOLOGY ABSTRACTS

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ABBREVIATIONS

A	ampere
AAS	atomic absorption Spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc
ECD.	electron capture detection
EDTA	ethylenediaminetetra acetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto-[10^{-15}, as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gn	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 l]
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycle/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcal, kg]
K	Kelvin
l	litre
lb	pound
lb	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-equiv	milli-equivalent
m	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt	.molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [kg m/s^2]
N.	North, Northern, normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	poise
P	probability
Pa	Pascal [N/m^2]
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	south, Southern, etc.
s.d.	standard deviation
SDS	sodium dedecylsulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
w	watt
W.	West,Western,etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-[as in g, m]
%:	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elem

ABBREVIATIONS FOR LANGUAG

Language of text	
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
spanish	Es
swedish	Sv

GENERAL

1755

Lightbody (MS). **New technological approaches to reducing uniformity in processed foods.** *Food Science and Technology Today* 4(1): 1990; 37-40

1756

Das (AK). **Policy issues on processed food industry.** *Indian Food Industry* 10(1): 1991; 14-15

1757

Shah (VJ). **The need for change and policy instrument in agro-exports.** *Indian Food Industry* 10(1): 1991; 16-18, 25

1758

Anon. **Random views on government policies affecting development of food processing sector in India.** *Indian Food Industry* 10(1): 1991; 19-21, 25

1759

George Issac. **Processed foods - A bird's eye-view.** *Indian Food Industry* 10(1): 1991; 22-25

1760

Bachmann (MR). **The role of food processing in developing countries.** *Food Reviews International* 7(4): 1991; 387-397

This article reviews development of agroindustries in industrialised and developing countries (development of food processing systems in industrialised countries, evolution of food processing in developing countries), a food processing system for developing countries (starting from traditional system, manufacturing of low-cost food, use of locally made equipment, use of local, renewable energy sources and use of energy-saving processing techniques, waste management and treatment of effluents). 10 references. SRA

1761

Wu (R-K). **Aromatic plant materials in Chinese foods and beverages.** *Food Reviews International* 7(4): 1991; 417-443

In this paper, an attempt is made to collect and correlate scattered information on large number of traditional aromatic plant materials used in Chinese foods and beverages and are compiled in a table. Representative materials of frequent use are selected and briefly reviewed. Aspects included are: aromatic plant materials in foods (cooked dishes, staple and snack food, cakes and pastry and small foods); aromatic plant materials (ginger, scallion, garlic, star anise and cassia, flower pepper, pepper, sesame oil, mushrooms, red jajube, pinenut, rose and osmanthus); aromatic plant materials in beverages (Chinese jasmine, Michelia alba, Aglaxa odorata and Chrysanthemum flower). 93 references. SRA

1762

Lee (DS), Haggar (PE), Lee (J) and Yam (KL). **Model for fresh produce respiration in modified atmospheres based on principles of enzyme kinetics.** *Journal of Food Science* 56(6): 1991; 1580-1585

A respiration model, based on enzyme kinetics, was proposed for predicting respiration rates of fresh produce as a function of O_2 and CO_2 concn. In this model, the dependence of respiration on O_2 was assumed to follow a Michaelis-Menten type equation ($r = V_m[O_2]/\{K_m + [O_2]\}$), and the effect of CO_2 on respiration to follow an uncompetitive inhibition model ($r = V_m[O_2]/\{K_m + (1 + [CO_2]/K_i)[O_2]\}$). The model predictions agreed well with published data for a variety of commodities and with experimental data for cut broccoli. Fresh produce respiration rates (O_2 consumption or CO_2 evolution) at various O_2 and CO_2 concn., as well as transient and equilibrium gas concn. within permeable packages, could be accurately predicted with the model equations. AS

FOOD PROCESSING

1763

Dennis (C). **Processing to provide consistent quality for the consumer.** *Food Science and Technology Today* 4(1): 1990; 28-32

1764

McFarlane (I). **In-line measurement of product quality for process control.** *Food Science and Technology Today* 4(1): 1990; 33-36

FOOD PACKAGING

1765

Labuza (TP). **Active food packaging technologies.** *Food Science and Technology Today* 4(1): 1990; 53-56

1766

Murthy (RAN), Baldev Raj, Vijayalakshmi (NS) and Veerraju (P). **Effect of volume of food simulating**

solvents in migration tests. *Deutsche Lebensmittel-Rundschau* 86(12): 1990: 392-394

Migration tests were carried out under IS test conditions employing different amounts of food simulating liquids (FSL) at 0.31, 0.37, 0.4, 0.47, 0.5, 0.66, 1.0 and 2.0 ml/sq.cm. Results showed that for a given test condition and packaging material, the vol. of FSL had no effect in the range of 0.5 - 2.0 ml/sq.cm on the amount of the migration. BV

1767
Gupta (M), Singh (B) and Jain (RK). **A study on potability and mechanical behaviour of plastic water storage tanks.** *Research and Industry, India* 37(1): 1992: 21-24

Linear low density polyethylene (LLDPE) water storage tanks having capacity of 200 - 500 l and wall thickness of 4 - 5 mm were analysed for overall migration of leachable additives at different temp. and extraction duration. Addition of carbon black reduces the tensile properties of LLDPE. The overall migration of leachable additives increased with the increase of temp. and extraction period. pH and dissolved solid of water samples drawn from filled tanks after 1 day and 10 days storage period were almost similar and within permissible limits. Bacteriological study also did not show any alteration in bacterial colony after 10 days of water storage in tanks. Potability and mechanical characteristics of LLDPE tanks satisfy BIS specification requirements. GS

FOOD ENGINEERING AND EQUIPMENT

1768
Marques (JPM), Le Loch (C), Wolff (E) and Rutledge (DN). **Monitoring freeze-drying by low resolution pulse NMR: Determination of sublimation endpoint.** *Journal of Food Science* 56(6): 1991: 1707-1710, 1728

An NMR method was developed for detection of the sublimation period endpoint during the freeze-drying of potato pieces. Longitudinal (T_1) and transverse (T_2) relaxation times were estimated using rapid NMR methods. Samples were immediately examined to determine presence of a frozen core. The plot of T_1 vs T_2 showed an abrupt increase at a point corresponding to the complete elimination of the frozen core. Similar T_1 vs T_2 curves were observed when monitoring freeze-drying of a single potato piece inside the NMR probe-head. The detection of an anomalous freeze-drying is possible by monitoring the T_1, the T_2 or the free induction decay signal. AS

1769
Hayakawa (K-I), Wang (J) and Gilbert (SG). **Simultaneous heat processing of high- and low-acid foods in semirigid containers - A theoretical analysis.** *Journal of Food Science* 56(6): 1991: 1714-1717

A one meal-set of military ration consists of heat sterilized, high-and low-acid foods in semirigid containers. These foods are processed separately because of large differences in lethality requirements. The feasibility of simultaneously processing a meal-set consisting of chili con carne, white rice, and sliced peach in syrup to minimize costs was examined. Simultaneous processing was not possible by adjusting initial temp. according to computer-simulation using food temp. data collected experimentally. However, it was possible when the container for peaches was insulated properly with expanded polystyrene. Proper insulation thickness was slightly dependent on z value of the target factor. AS

Equipments

1770
Zaman (S), Rotstein (E) and Valentas (KJ). **Can material influence on the performance of rotating cookers.** *Journal of Food Science* 56(6): 1991: 1718-1724

The rotational performance of ETP (electro-tin-plated) and TFS (tin-free-steel) cans was studied in pilot and commercial cookers, and in a cooker simulator. TFS cans rotated less than ETP cans in both commercial and pilot cookers. Commercial cookers showed less can rotations than corresponding pilot scale experiments. The simulator predicted an exponential decay in lethality with decreased can r.p.m. Polymer coated cans conditioned the cooker surface and the extent depended on contact time. Heat transfer depended on can rotation and could be predicted with a suitable correlation. The correlation was used to predict lethality performance as well as exit temp. of processed foods. AS

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

1771

Davidek (T), Velisek (J), Davidek (J) and Pech (P). **Glycylglycine-derived 1,3-disubstituted imidazole in nonenzymatic browning reations.** *Journal of Agricultural and Food Chemistry* 39(8): 1991; 1374-1377

5-[3-(3-Aza-4-carboxy-2-oxo-1-butyl)-1-imidazolium]-3-aza-4-oxopentanoate was identified in a model reaction mixture containing glycylglycine, glyoxal, and formaldehyde. The structure of this compound was elucidated from the measured mass, ^{1}H NMR, and ^{13}C NMR spectral data. The stability of the compound as well as the dependence of its formation on pH value of the reaction mixture was studied. This 1,3-symmetrically substituted imidazole represents a new imidazole derivative not previously described either as a product of nonenzymatic browning reactions or as a product of any other reaction. AS

1772

Canjura (FL), Schwartz (SJ) and Nunes (RV). **Degradation kinetics of chlorophylls and chlorophyllides.** *Journal of Food Science* 56(6): 1991; 1639-1643

Thermal degradation of chlorophylls and chlorophyllides in spinach puree was studied from 100 to 145 C (2-25 min.) for chlorophylls and from 80 to 115 C (2.5 - 39 min.) for chlorophyllides. The derivatives formed were: pheophorbides, pyropheophorbides, pheophytins and pyropheophytins. Degradation kinetics of chlorophylls and chlorophyllides followed a first-order kinetic model. Reaction rate data showed that the 'a' form of both chlorophylls and chlorophyllides degraded more rapidly than the 'b' form. Chlorophyllides were less stable than chlorophylls. Activation energies ranged from 15.0 to 22.8 Kcal/mol. A kinetic compensation effect was observed for both chlorophylls and chlorophyllides with an isokinetic temp. of 160.8 C. The relative stability of these compounds suggests that methods to maximize chlorophyllides would not be effective for improving green colour stability. AS

1773

Degnan (AJ), Von Elbe (JH) and Hartel (RW). **Extraction of annatto seed pigment by supercritical carbon dioxide.** *Journal of Food Science* 56(6); 1991; 1655-1659

Operating pressures ranged 3000 - 7000 psi and temp. 40 - 55 C. Max solubility of pure bixin was 0.003 and of annatto seed pigment 0.26 mg/g CO_2. Analyses of annatto seed pigment from supercritical carbon dioxide extractions showed only α- and β-bixin present. Only bixin was extracted from mixed samples consisting of bixin and norbixin. No thermal degradation product was detected in samples extracted within the temp. range used. Increased temp. resulted in increased pigment/g CO_2 at all pressures. Isothermal increases in pressure did not increase pigment/g CO_2. Efficiency of annatto pigment extraction was increased in the presence of an oil. AS

1774

Tsoubeli (MN) and Labuza (TP). **Accelerated kinetic study of aspartame degradation in the neutral pH range.** *Journal of Food Science* 56(6): 1991; 1671-1675

The degradation of aspartame in solution as a function of temp. (70 - 100 C), buffer concn. (0.01 - 0.1 M phosphate), and pH (6 - 7) was studied in order to estimate losses during thermal processing and storage of aseptic milk-based drinks. Prior data have been mostly on acid carbonated beverages. First order rate constants were obtained in all the conditions with activation energies in the range 14 - 20 kcal/mole. An increase in both pH and buffer concn. caused an increase in rate of loss. These data were used to predict losses that would occur during pasteurization and sterilization conditions. Experiments at 4 and 30 C showed significant losses would occur during 4 and 30 C temp. storage and extrapolation from high temp. predicted faster degradation rates than those found. AS

1775

Ang (JF). **Water retention capacity and viscosity effect of powdered cellulose.** *Journal of Food Science* 56(6); 1991; 1682-1684

Powdered cellulose is a natural β-1,4-glucan polymer. It is 99% total dietary fiber (dwb) and has many uses as a low-calorie food ingredient. Depending on its fiber length, cellulose can retain 3.5 to 10 times its wt. in water. Temp. and pH exerted small effects on water retention capacity. A powdered cellulose with a 110-micron fiber length significantly increased viscosity. Its ability to increase viscosity was further magnified in solutions containing low amounts of stabilizers. This fiber may act synergistically with other stabilizers to increase viscosity. AS

1776

Hamidani (AU) and Sanghavi (JR). **Improvement in the quality of salt from inland brine of**

Kharaghoda area. *Research and Industry, India* 37(1): 1992: 46-48

The edible salt obtained from inland brine in Kharaghoda area of Bhavnagar, Gujarat State is of inferior quality as it contains higher (content 1.5%) amounts of calcium sulphate impurity. Calcium sulphate to the extent of 48% was separated out at 24.8°Be' brine density from subsoil brine whereas in case of sea brine it was 83.8%. The total calcium sulphate separation from subsoil brine is also related to the total sulphate ion concn. of the brine. By adding magnesium sulphate and sodium sulphate to the subsoil brine about 55% of the total calcium sulphate content of the 24.0°Be' subsoil brine could be separated till the density of the brine attained 24.8°Be'. By adding sea bittern about 50% of calcium sulphate separation could be obtained till 24.5°Be' density. KAR

Chemistry (Analytical)

1777
Saad (BB) and Jashinta Devi. **Determination of sodium in processed foodstuffs using a bis(12-crown-4) derivative-based poly(vinyl chloride) membrane electrode.** *Journal of the Science of Food and Agriculture* 56(3): 1991: 403-406

A poly(vinyl chloride) matrix membrane Na selective electrode based on bis[(12-crown-4)ylmethyl] 2-dedecyl-2-methylmalonate ((12-crown-4)yl = 1,4,7,10-tetraoxacyclododecyl) was utilised for the detn. of Na in various foodstuffs such as soup stocks, instant noodle stocks and milk powders. Good agreement was obtained between the proposed electrode and flame photometric methods. Also, the electrode exhibits min interference from K, Ca, Mg, Fe(III), Cu(II) and glucose, and from the synthetic colours tested. AS

1778
Barbera (R), Farre (R) and Lozano (A). **Determination of manganese in vegetal foods by atomic absorption spectrometry.** *Anales de Bromatologia* 42(1): 1990: 127-132 (Es)

A flame atomic absorption spectrometry method for Mn detn. in foods after acid decomposition of organic matter is reported. The results obtained with respect to linearity range (0, 2.7 µg/ml), detection and quantitation limits (24.12 and 60.49 ng/ml) respectively, precision (CV = 4.39%), and accuracy performed by recovery assays (100.42%), as well as the tests with a certified patron (Citrus Leaves NBS 1572) (certified value 23 + 2 ng/g, found value 21.8 + 0.2 ng/g) and the absence of interferences show that the method is useful for Mn detn. at the concn. usually present in vegetable foods. AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

1779
McKay (AM). **Production of extracellular β-glucosidase and α-galactosidase during fungal growth on polygalacturonate.** *Journal of Food Science* 56(6): 1991: 1749-1750

Filamentous fungi (*Aspergillus oryzae*, *Scopulariopsis* sp., and *Penicillium brevicompactum*) and yeast-like fungi (*Aureobasidium pullulans*) were induced to produce extracellular β-D-glucosidase (β-D-glucosidase glucohydrolase, EC 3.2.1.21) and α-D-galactosidase (α-D-galactoside galactohydrolase), EC 3.2.1.22) by polygalacturonate in the growth medium. These extracellular enzymes were not produced during growth of the microorganisms on cellobiose or melibiose. AS

1780
Sadhukhan (R), Roy (SK), Raha (SK), Manna (S) and Chakrabarty (SL). **Induction and regulation of α-amylase synthesis in a cellulolytic thermophilic fungus *Myceliophthora thermophila* D14 (ATCC 48104).** *Indian Journal of Experimental Biology* 30(6): 1992: 482-486

The effect of various carbohydrate sources on regulation of α-amylase produced by *Myceliophthora thermophila* D-14 grown in Czapek-Dox medium was studied. Results indicated that max. enzyme production was with 1% starch followed by a gradual decrease with increasing concn. α-Amylase synthesis decreased with the addition of glucose and the decrease was proportional to the concn. of glucose. The enzyme synthesis was resumed as the glucose concn. fell below the critical level. The addition of cAMP did not eliminate the repressive activity of glucose. Results suggest that extracellular α-amylase synthesis in *M. thermophila* D-14 was inducible and subject to catabolite repression. SRA

1781
Deshpande (MS), Bhat (SG), Thatte (JC), Kulkarni (MA) and Rale (VB). **Pigmentation and phenol oxidase during pullulan production by *Aureobasidium pullulans*.** *Indian Journal of Microbiology* 32(1): 1992: 95-97

Pullulan is a polysaccharide used as a low-calorie ingredient in foods. It is manufactured by fermentation of raw materials such as sucrose or starch hydrolysates. *Aureobasidium pullulans* an yeast like fungus produces phenoloxidase and its relation to pigmentation during pullulan production is studied. Results indicate that the pigmentation in *A. pullulans* is associated with the phenoloxidase activity and with the use of nitrate in the growth medium. Pigmentation can be eliminated to get a colour free pullulan. GS

Fermented foods

1782

Lim (G). **Indigenous fermented foods in South East Asia.** *ASEAN Food Journal* 6(3): 1991: 83-101

This article briefly describes the various fermented foods produced by fungal action. Types of indigenous fermented foods (alcoholic beverages, foods, flavouring agents, miscellaneous), fungi used in fermentations (beer yeasts, rice wine fungi, toddy yeasts, tape fungi, tempeh fungi, oncom fungi, soy sauce fungi, Tau-si and tau-cheo fungi, Agn-kak fungi) and some problems of indigenous fermented foods are the aspects covered in this article. BV

Microorganisms

Bacteria

Lactococcus

1783

Al-Zoreky (N) and Sandine (WE). ***Lactococcus* genus: A selective and differential agar medium.** *Journal of Food Science* 56(6): 1991: 1729-1730, 1734

An agar medium (Alsan), was selective for *Lactococcus lactis* subsp. *lactis* and *Lactococcus lactis* subsp. *lactis* biovar. *diacetylactis*. The former developed white or yellow colonies; the latter gave blue-green or blue colonies. Eleven strains of *L. lactis* subsp. *cremoris* did not grow in this medium. The medium contained phenylethanol agar, lactose, glycine anhydride, lithium chloride and trimethoprim. In comparison with M17 medium, Alsan was not significantly different ($P > 0.05$) in recovering either bacterium. Furthermore, the medium inhibited the common food genera *Pseudomonas*, *Escherichia*, *Leuconostoc*, *Enterococcus* and *Lactobacillus*. Bacteriophage plaque sizes of 0.4 - 0.5 cm were demonstrated on the medium using a lactococcal bacteriophage. AS

Penicillium

1784

Matsuoka (H), Fuke (Y), Kaminogawa (S) and Yamauchi (K). **Purification and debittering effect of aminopeptidase II from *Penicillium caseicolum*.** *Journal of Agricultural and Food Chemistry* 39(8): 1991: 1392-1395

An extracellular aminopeptidase II was purified by chromatographic techniques from *Penicillium caseicolum*. The enzyme was most active at pH 8.0 and was stable over a wide pH range. The activity was inhibited by metal chelating agents and by 2-mercaptoethanol. The enzyme was remarkably activated by the addition of Co^{2+}. The mol. wt. of the enzyme was estimated to be 20 000 by Sephadex G-100, and the enzyme was the monomer when determined by SDS-PAGE. The enzyme has a wide specificity for various substrates, and it was capable of cleaving amino-terminal leucine and phenylalanine residues of dipeptides and oligopeptides. The effect of debittering for bitter peptide fraction from peptic casein was clearly found by APase II treatment for 3 h. AS

Salmonella typhimurium

1785

Sumner (SS), Sandros (TM), Harmon (MC), Scott (VN) and Bernard (DT). **Heat resistance of *Salmonella typhimurium* and *Listeria monocytogenes* in sucrose solutions of various water activities.** *Journal of Food Science* 56(6): 1991: 1741-1743

The heat resistance of *Salmonella typhimurium* was determined in sucrose sol. with a_w ranging from 0.98 - 0.83. The $D_{65.6\ C}$ ranged from 0.29 - 40.2 min (> 100-fold increase), with Z value 6.5 - 7.7 C. *S. typhimurium* was also heated in four chocolate syrups purchased at retail. The $D_{65.6\ C}$ ranged from 1.2 - 3.2 min while the a_w of the syrups ranged for 0.75 - 0.84. The heat resistance of *Listeria monocytogenes* was determined in sucrose sol. with a_w ranging from 0.98 - 0.90. The $D_{65.6\ C}$ value shifted from 0.36 - 0.38 min (10-fold increase); the Z value ranged from 7.6 - 12.9 C. AS

Fungi

Neosartorya fischeri

1786

Nielsen (PV). **Preservative and temperature effect on growth of three varieties of the heat-resistant mold, *Neosartorya fischeri*, as measured by an impedimetric method.** *Journal of Food Science* 56(6): 1991: 1735-1740

The combined effects of inoculum amount, temp. pH, and food preservatives on growth of three var. of heat-resistant mold *N. fischeri* cultured on a fruit juice-like medium was investigated. *N. fescheri* var. *glabra* growth occurred at 100 mg sodium benzoate/L at pH 3.5, a level that completely inhibited outgrowth of the other var. All were similarly affected by SO_2: completely inhibited by 300 mg/L at pH 3.5. The inhibitory effect of preservatives was strongly affected by pH, inoculum amount, and temp. Growth was significantly delayed when temp. was decreased from 32 to 25 to 18 C or pH from 4.5 to 3.5. This is the first report on the use of impedance microbiology to study the effects of environmental factors on molds. AS

Yeasts

1787

Fleet (G). **Spoilage yeasts.** *CRC Critical Reviews in Biotechnology* 12(1/2): 1992: 1-44

This review article covers the occurrence and growth of yeasts with respect to spoilage activities, the biochemistry of spoilage and technologies for enumeration and identification of spoilage in foods and beverages - fresh/processed red/poultry meat, seafoods, dairy products (milk, cream, butter, yoghurt and cheese), fresh/processed fruits/vegetables, food with high sugar/salt, bakery products, alcoholic beverages (beer and wine), grains/grain silage and miscellaneous fermented products. 453 references. SD

1788

Sathe (S), Shivaraman (H) and Gokhale (DV). **Protoplast fusion in yeast: strain improvement in *Saccharomyces*.** *Indian Journal of Microbiology* 32(1): 1992: 15-27

Reviews the use of protoplast fusion techniques in the development of improved strains of *Saccharomyces* for brewing, wine making, baking and production of food. The technique is applicable to a wide range of bacteria, fungi, yeasts and algae. This technique allows the construction of industrially important strains containing new and unique fermentation and growth characteristics. 123 references. GS

BIOTECHNOLOGY

1789

Mariani (F). **Biocontamination, sources and vehicles in the food industry.** *Industrie Alimentari* 30(296): 1991: 724-726 (It)

TISSUE CULTURE

Nil

FOOD ADDITIVES

Flavourings

1790

Burdock (GA), Pence (DH) and Ford (RA). **Safety evaluation of benzophenone.** *Food and Chemical Toxicology* 29(11): 1991: 741-750

Benzophenone (FEMA No. 2134; CAS No. 119-61-9) was administered in the diet to rats at target dose levels of 20 mg/kg body wt./day for 90 days and 100 or 500 mg/kg/day for 28 days. Body wt. and food consumption were measured weekly; haematology, clinical chemistry and urinalysis values were obtained at 4 wk and at the end of the study. Gross and microscopic pathological examinations were conducted and organ wt. were recorded. Treatment-related changes occurred in erythrocyte count, haemoglobin, haematocrit, bilirubin, total protein and albumin at the mid- and high-dose levels, although all changes did not occur in both groups in both sexes. There were indications of increased absolute and relative liver and kidney wt. in the mid- and high-dose groups, but this was not statistically consistent for absolute kidney wt. Histopathology of the liver in the mid- and high-dose groups showed heptacellular enlargement with an associated clumping of cytoplasmic basophilic material around the central vein. A no-effect level was demonstrated at 20 mg/kg/day for 90 days of adminstration. This would be equivalent to an intake of 1200 mg/day for a 60-kg human. On the basis of the calculated Possible Average Daily Intake of 0.33 mg/day, a safety factor of > 3600 is demonstrated. The safety factor based on the more realistic *per capita* consumption of 0.32 μg/day would be approx. 3.7 million. AS

CEREALS

1791

Bailey (LN), Hauck (BW), Sevatson (ES) and Singer (RE). **Systems for manufacture of ready-to-eat breakfast cereals using twin-screw extrusion.** *Cereal Foods World* 36(10): 1991: 863-864, 866, 868-869

Describes how twin-screw extrusion cooking can be adapted to the manufacture of either flaked or direct-expanded ready-to-eat breakfast cereals. BV

1792

Burns (RE) and Fast (RB). **Design and operation of equipment for coating breakfast cereals.** *Cereal Foods World* 36(10); 1991; 879-887

The coating of breakfast cereals for either nutritional or flavouring purposes is discussed in terms of some of the equipment involved and of the effect of various coating formulations. BV

1793

Sinha (KK). **Prevention of aflatoxin production in some cereals and oilseeds by natural plant constituents.** *Irish Journal of Food Science and Technology* 14(2); 1990; 109-120

Phenolic compounds or the crude extracts of *Croton spersiflorum*, *Thysanolaena maxima*, *Myrtus communis*, *Lawsonia alba* and *Taxodium distichum* prevented aflatoxin production in cereals and oilseeds. At 0.01 M concn. on rice, caffeic and ferulic acids inhibited toxin elaboration by 60.8% and 55.9% respectively. Tannic acid caused most inhibition in wheat (58.33%) and maize (68.42%) and phloroglucinol in groundnut (70.53%) and mustard (57.14%). BV

Barleys

1794

Szczodrak (J) and Pomeranz (Y). **Starch and enzyme-resistant starch from high-amylose barley.** *Cereal Chemistry* 68(6); 1991; 589-596

A Glacier var. selection with a 43% amylose content was used for isolation and purification of barley starch. The starch was separated into two fractions that varied in granule size, and the two fractions were assayed using chemical, microscopic (scanning electron microscopy), and thermo-analytical methods. Large and small barley starch granules were different in both chemical composition and endothermic properties; the small starch granules were higher in amylose than the large granules. Heat-moisture treatment (autoclaving at 121 C) with subsequent cooling was used to produce amylase-resistant starch (RS) from purified high-amylose starch samples. The formation of RS in barley was strongly affected by the number of autoclaving-cooling cycles; increasing the number of cycles from one to 20 raised the RS yield from 6 to 26%. Differential scanning calorimetry thermograms showed that all isolated RS preparations exhibited an endothermic transition over a similar temp. range (116-177 C), with a mean peak temp. at 158 C, which could apparently be attributed to the melting of RS amylose crystallites. The max melting enthalpy for RS from barley, 37 J/g, was achieved by 12 repeated autoclaving-cooling cycles. The thermodynamic data indicated that changes in the quality of RS occurred during autoclaving-cooling cycles. AS

Oats

1795

Rabault (J-L) and Downey (G). **Rapid analysis of oats for moisture and protein by near-infrared reflectance spectroscopy.** *Irish Journal of Food Science and Technology* 14(2); 1990; 85-93

Using a closed sample population, calibrations have been developed to predict moisture in coarsely ground oats (*Avena sativa*) (range 11.6 - 21.4%) and protein and moisture in finely ground oat grain (protein range 7.7 - 12.9%; moisture range 10.3 - 14.7%). NIR reflectance spectroscopy has been used for rapid analysis. GS

Oatmeals

1796

Jansson (KW) and Lindahl (L). **Rheological changes in oatmeal suspensions during heat treatment.** *Journal of Food Science* 56(6); 1991; 1685-1689

Two amylases from fungal and bacterial source were added to oatmeal suspensions in concn. varying from 0.0125 to 0.64%. Changes in viscosity, phase angle and elastic modulus during heating were followed together with sedimentation and flow properties. The complete pasting behaviour could be followed without sedimentation problems. The hydrocolloidal properties of β-glucans appeared to be important. The bacteria/enzyme reduced peak viscosity much more rapidly than the Fungamyl enzyme at low concn. The flow properties of a Fungamyl treated oat meal suspension with the peak viscosity reduced > 90% were pseudoplastic. AS

Rice

1797

Chandrasekhar (PR) and Chattopadhyay (PK). **Rice puffing in relation to its varietal characteristics and processing conditions.** *Journal of Food Process Engineering* 14(4); 1991; 261-277

The effect of rice varietal characteristics, namely, length (L): breadth (B), ratio, amylose and protein contents and processing conditions namely, extent/degree of hydrothermal treatment, degree of milling and percentage of salt addition to rice, on puffing quality were studied in detail. The L:B ratio of var. tested showed a positive correlation (r = 0.69) with expansion ratio (ER) of puffed rice produced. Total amylose and hot water insoluble amylose contents revealed a definite pattern of relationship, with ER showing predicted peaks at 28.5% total amylose (db) and 13.5% insoluble amylose (db) for highest ER. Protein content showed a negative relationship (r = -0.79) with ER. A new method for determining extent/degree of starch gelatinization, based on Brabender hot paste peak viscosity value (viscosity of 15% slurry retained at 95 C for 20 min.) was used in this study. Normal parboiled and pressure parboiled rice having 425 BU and 240 BU peak viscosities produced highest ER of 7.5 and 9.7, respectively. A 6% milling (min) and a 2% salt ($NaCl/CaCl_2$) addition during preconditioning of rice resulted in max ER. AS

1798

Marshall (WE) and Normand (FL). **Exothermic transitions in whole grain milled rice and milled rice flour studied by differential scanning calorimetry.** *Cereal Chemistry* 68(6): 1991: 606-609

Cooling curves for long, medium, and short grain varieties and very low amylose var. of whole grain milled rice and their milled rice flours were generated by differential scanning calorimetry at a constant cooling rate of 1.0 C/min. Two successive heating and cooling cycles were run, but data were reported only for the two cooling cycles. Exothermic transitions were produced from all var., at least during the first cooling cycle. Exotherms were attributed to the crystallization of amylose-lipid complexes within the starch granule and were quantified by determining enthalpies (ΔH) for crystallization process. Exotherm formation during the first cooling cycle was influenced by the amount of rice lipid removed from the kernel or flour, the presence of intact kernel structure, and the amylose content of the rice. In most cases, exotherms were produced during the second cooling cycle and were smaller in magnitude than those originating from the first cooling. The degree of amylose-lipid complex formation during the second cooling was independent of rice lipid, kernel structure and amylose content. These exotherms appeared to depend only on the particular rice var. examined. AS

Rice bran

1799

Fellers (DA). **Rice bran stabilization and recovery of edible oil-technical and financial feasibility.** *Food Reviews International* 7(4): 1991: 445-483

The purpose of this paper is to consider and evaluate extruder cooker stabilization of rice bran in the overall process of producing edible rice bran oil. Alternate pathways in the production of refined, edible rice bran oil where in rice bran stabilization is part of the overall process are schematically presented. Other aspects covered are, potential for rice bran oil production, rice bran - the raw material, rice bran collection, stabilization, oil extraction, refining and bran to oil - financial feasibility. 52 references. SRA

Ryes

1800

Vinkx (CJA), Van Nieuwenhove (CG) and Delcour (JA). **Physicochemical and functional properties of rye nonstarch polysaccharides. III. Oxidative gelation of a fraction containing water-soluble pentosans and proteins.** *Cereal Chemistry* 68(6): 1991: 617-622

Pentosan-protein material from rye is subject to oxidative gelation. Thus, solutions of a fraction (obtained by precipitating water solubles from rye with ethanol) gel when solutions of hydrogen peroxide and horseradish peroxidase are added. The gelation reaction is inhibited by ferulic and vanillic acid but not by fumaric acid. This suggests that the mechanism whereby gelation occurs is comparable to that of wheat pentosan-protein material, in that the ferulic acid aromatic ring and not the propenoic moiety is involved in the gelation. Enzyme treatments showed that although protein probably is not necessary for the oxidative process, the presence of the pentosan moiety is required. Cysteine residues in the protein most likely are not involved in the gelation because N-ethyl-maleimide has no effect on gelation, and the inhibition of the gelation reaction by cysteine can be rationalized as an effect of competition for the hydrogen peroxide. Ascorbic acid also inhibited the gelation, and its role probably can be ascribed at least partially to the same mechanism. High concn. of cysteine or ascorbic acid in the presence of peroxidase and hydrogen peroxide reduced the relative viscosity of a pentosan-protein solution to experimental readings below those of the ungelled control solution. AS

Wheat

1801

Larsson (BK), Regner (S) and Baeling (P). **Polycyclic aromatic hydrocarbon and volatile N-nitrosamine content of wheat grain before and after direct gas-fired drying.** *Journal of the Science of Food and Agriculture* 56(3): 1991: 373-384

No differences in the level of polycyclic aromatic hydrocarbon (PAH) or detectable amounts of volatile N-nitrosamine were observed in the ingoing and outgoing samples, before or after drying. GS

1802

Boyacioglu (MH), Dick (JW) and D'Appolonia (BL). **A comparison of the Chopin-Dubois and modified Buhler durum wheat laboratory mills.** *Cereal Foods World* 36(10); 1991; 893-896

A Chopin-Dubois CD 2 mill, a durum wheat laboratory mill for producing semolina from durum wheat, was compared to a Buhler MLU 202 mill modified for milling durum wheat. Seventeen durum wheat cvs from California, North Dakota, Minnesota and Montana were milled in both mills. Semolina from both mills was purified similarly. Total extraction, semolina extraction, moisture, ash, protein, wet gluten, specks, and mixogram data were statistically analyzed. Semolina produced from the Chopin-Dubois CD 2 mill was significantly ($P = 0.05$) lower in percent moisture and speck count and higher in percent ash and mixogram score than that from the modified Buhler mill. AS

1803

Sosulski (FW), Lee (WJ) and Sokhansanj (S). **Wet milling and separation of wheat distillers' grains with solubles into dietary fiber and protein fractions.** *Cereal Chemistry* 68(6); 1991; 562-565

Wheat-based stillage from a fuel ethanol plant was wet milled by sonication, abrasive stone milling, and blade grinding before fractionation by seiving and centrifugation into distillers' grains (DG), centrifuged solids (CS), and thin stillage. Blade grinding was the most effective method for separating protein and fiber in stillage, with 40% of the fiber being concentrated in DG and over 70% of protein in CS. The DG, which contained over 70% of total dietary fiber, exhibited high water- and oil-absorption capacities and had potential as a fiber ingredient in foods. The CS fraction contained 60% protein and was lower in functionality than DG. Further studies are required to identify potential uses for the fractions and the economic feasibility of the process. AS

1804

Lukow (OM) and Mcvetty (PBE). **Effect of cultivar and environment on quality characteristics of spring wheat.** *Cereal Chemistry* 68(6); 1991; 597-601

The eight spring wheat cvs used in this study displayed a broad range in milling and baking quality. The best and poorest in overall breadmaking quality were represented by the cvs Columbus and UM841, respectively. The semidwarf wheats Len and Norseman compared most favourably to Columbus and were also among the most environmentally stable cvs. Both cv and environment had a significant effect on quality parameters. Cv by environment effects were statistically significant but relatively small in magnitude for most parameters, as confirmed by the rank correlation results. Composited samples over locations would be suitable for quality assessment for semidwarf wheats grown in Western Canada for most of the characteristics studied. For the quality parameters that displayed large cv by environment interactions (i.e. test wt. and thousand-kernel wt.), samples from several environments should be used for quality evaluation, particularly in advanced generation breeding lines. AS

1805

Grant (LA) and D'Appolonia (BL). **Effects of low-level gamma-radiation on water-soluble nonstarchy polysaccharides isolated from hard red spring wheat flour and bran.** *Cereal Chemistry* 68(6); 1991; 651-652

1806

Baguena (R), Soriano (MD), Martinez-Anaya (MA) and Benedito De Barber (C). **Viability and performance of pure yeast strains in frozen wheat dough.** *Journal of Food Science* 56(6); 1991; 1690-1694, 1698

Freezing and subsequent storage of wheat doughs containing *Saccharomyces cerevisiae*, *S. fructuum* or *Candida boldinii* after undergoing a bulk fermentation step, reduced the viability of yeasts, depending on the sp. Freezing and storage of doughs without bulk fermentation had no effect on viability. Gassing power was affected most by frozen storage, depending on storage time and sp. Changes in acidification capability were small, and only significant for total titratable acidity. Changes in sugars and leavening were closely related. Results showed that the use of less active yeast sp (*S. fructum*), with high freezing tolerance in frozen dough processes would be of practical interest. AS

Wheat proteins

1807

El-Sakr (AS) and Mansour (SM). **Nutritive value of wheat germ proteins supplemented with lysine.** *Grasas y Aceites* 41(1); 1990; 52-58

Feedings experiments were carried out by using wheat germ supplemented with 0.24% lysine and wheat germ. The protein of different diets correspond to 10% of the gross energy value. Amino acids patterns for wheat germ showed that most of the essential amino acids are present in optimal concn. The highest levels are achieved by leucine plus isoleucine and lysine. NPR, PER digestibility and NPV for wheat germ supplemented with lysine were lower values, compared with those given by wheat germ that were higher values. High significant differences for the PER values between the diets were found. AS

1808

He (H), Feng (GH) and Hoseney (RC). **Differences between flours in the rate of wheat protein solubility.** *Cereal Chemistry* 68(6): 1991: 641-644

Extraction of flour with 1% sodium dodecyl sulphate (SDS), pH 7.0 showed that the proteins in poor-quality flour were solubilized at a faster rate than were those in good-quality flour, and the protein solubility of both flours increased with extraction time. When a sufficient extraction time was used, essentially all the flour proteins were solubilized. The relative viscosity of protein per milliliter of the protein solution from a strong flour was slightly higher (6%) than that of a similar extract from a weak flour. This indicates that the av. mol. wt. of the proteins in the strong flour was slightly larger. The relative viscosity per milligram of protein per milliliter of the protein solutions decreased with additional extraction time. A study of SDS-polyacrylamide gel electrophoresis and relative viscosity of unheated and heated protein samples showed that the decrease in viscosity was caused mainly by further dissociation of solubilized but still aggregated protein. AS

MILLETS

Corn

1809

Lee (WJ), Sosulski (FW) and Sokansanj (S). **Yield and composition of soluble and insoluble fractions from corn and wheat stillages.** *Cereal Chemistry* 68(6): 1991: 559-562

To assess their potential as sources of dietary fiber and protein ingredients, stillages were sampled from the beer stills of three commercial ethanol distilleries that were processing corn, wheat, or corn-wheat mashes. The distillers' grains with solubles (DGS) from wheat-based mashes contained more dietary fiber and protein and less lipid, than did corn-based DGS. Fractionation of the DGS into distillers' grains (DG) centrifuged solids (CS), and stillage solubles (SS) gave a partial separation of fiber into DG and protein into CS, but the yield of CS was too low for consideration as a commercial process. The wt. distributions of DG, CS and SS were approx. 42:2:56 wb and 75:5:20 db; further studies are required to effect a greater recovery of the CS fraction at a high protein level. AS

1810

Dorsey-Redding (C), Hurburgh (CRJr), Johnson (LA) and Fox (SR). **Relationships among maize quality factors.** *Cereal Chemistry* 68(6): 1991: 602-605

Maize properties believed to affect yield and quality of maize products were correlated. Samples of 183 genetically diverse maize hybrids grown in central Iowa in 1987 and 195 in 1988 were analyzed for protein, oil, starch, bulk density (test wt.), breakage susceptibility, kernel density, water absorptivity, hardness and average kernel wt. (1,000-grain wt.). Data were adjusted to 15.5% moisture basis. Hardness showed a significant correlation ($r > 0.6$) with protein, test wt. and kernel density. Oil was correlated ($r > 0.5$) with density and starch content and, to a lesser extent ($r > 0.4$), with test wt. and hardness. Prediction equations for hard-to-measure factors, hardness and density ($R^2 = 0.8, 0.7$), were developed from protein, oil, and test wt. The 1988 data were used to validate the 1987 results. The 1987 and 1988 correlation coeff. agreed in that they always had the same sign and were generally close in value. The 1987 and 1988 prediction equations also agreed in that the mean difference between predicted and actual values for both data sets were not significantly different ($P = 0.05$). AS

1811

Ning (L), Villota (R) and Artz (WE). **Modification of corn fiber through chemical treatments in combination with twin-screw extrusion.** *Cereal Chemistry* 68(6): 1991: 632-636

Corn fiber modification was achieved through acid, alkaline, and consecutive acid-alkaline treatments in combination with simultaneous thermal treatment. Twin-screw extrusion of the modified corn fiber was conducted to achieve additional fiber solubilization. A comparative study was performed on the functional properties of native and chemically modified corn fiber with and without extrusion. Soluble fiber content increased after chemical treatments alone or in combination with twin-screw extrusion. Consecutive acid-alkaline treatment most effectively increased the solubility of corn fiber. X-ray diffraction and scanning electron microscopy revealed altered fiber crystallinity and intermolecular structure after chemical and extrusion treatments. AS

Corn flour

1812

Gomez (MH), Waniska (RD) and Rooney (LW). **Starch characterization of nixtamalized corn flour.** *Cereal Chemistry* 68(6): 1991: 578-582

Commercial nixtamalized corn flours used to prepare tortilla and tortilla chips were analyzed for particle size distribution, composition and functionality. Changes in starch crystallinity, solubility and kernel microstructure were evaluated in commercial samples of raw corn, alkaline-cooked and steeped corn (nixtamal), ground nixtamal (masa), and nixtamalized corn flour (NCF). The coarse, intermediate and fine particle size fractions of NCF had similar chemical composition and distribution of anatomical parts. Starch in the large particles of NCF was less damaged during grinding and was more soluble after autoclaving and sonication. Starch in the intermediate and smaller particle size fractions was more mechanically damaged, gelatinized and retrograded as indicated by decreased starch solubility (after autoclaving and sonication). NCF drying, the last thermal operation during processing, caused partial starch gelatinization and retrogradation, decreasing starch crystallinity. Thus, starch functionality was modified during NCF preparation, which negatively affected the rheological characteristics of rehydrated NCF; that is, it decreased the cohesiveness and plasticity of the NCF and the shelf-life of baked products, so that tortillas became stale sooner. AS

Corn meal

1813

Camire (ME) and Flint (SI). **Thermal processing effects on dietary fiber composition and hydration capacity in corn meal, oatmeal and potato peels.** *Cereal Chemistry* 68(6): 1991: 645-647

The effects of extrusion-cooking and baking on the dietary fiber composition and hydration capacity of corn meal, oatmeal and potato peels were compared. Total nonstarch polysaccharides increased in oatmeal and potato peels with both processes, but the ratio of soluble to insoluble nonstarch polysaccharides was higher in the extruded samples. Uronic acids were not affected by processing; Klason lignin decreased in potato peels only. Values for nonstarch polysaccharides generally increased when resistant starch was not removed by dispersion with dimethylsulphoxide prior to enzymatic digestion. Extrusion increased hydration capacity of corn meal and oatmeal; processed potato peels had lower hydration capacities than raw peels. AS

PULSES

1814

Kapoor (VP), Banerji (R) and Prakash (D). **Leguminous seeds: potential industrial sources for gum, fat and protein.** *Journal of Scientific and Industrial Research* 51(1): 1992: 1-22

The National Botanical Research Institute of Lucknow, India has carried out analysis of leguminoseae family seeds collected from all over India for water soluble gums, moisture, protein, and pentosans. The tabulated results show that the seeds of the genera *Cassia*, *Crotelaria*, *Indigofera*, *Melilotus* and *Sesbania* are rich in gum contents, whereas all the sp. of *Acacia*, *Albizzia*, *Canavalia*, *Erythrina*, *Millettia*, *Tephrosis* and others were devoid of gum. In contrast, a few sp. of *Bauhinia*, *Caesalpinia*, *Desmodium* and some others contained appreciable amounts of gum but some sp. of the same genera were poor in gum. The part of the seed where gum is present in different seeds, is also indicated. Some potential sources of gums, which have been neglected, and some of which are cultivated and others are forest trees have also been given in tabular form. The fatty acid composition of oils from some under-utilized leguminous seeds are given; the oil content ranges from 0.2 to 30%. The crude protein of 161 leguminous seeds along with their amino acid content is also given which is useful in the utilization of seed meal. KAR

Chickpeas

1815

Batistuti (JP), Barros (RMC) and Areas (JAG). **Optimization of extrusion cooking process for chickpea (*Cicer arietinum* L.) defatted flour by response surface methodology.** *Journal of Food Science* 56(6): 1991: 1695-1698

Response surface methodology was employed to optimize the production of a snack food from chickpea. The independent variables process temp. (123 - 137 C) and feed moisture (13 - 27% d.s.b.) were selected at five levels (rotatable five level composite design: - square root 2, -1, 0, 1, + square root 2) in the extrusion of defatted chickpea flour. Response variables were expansion ratio, shear strength of the extrudate and sensory preference assessed by an untrained panel. Expansion ratio increased steadily with decrease in feed moisture similar to cereal extrusion. Regions of maxima were observed for sensory preference and shear strength, and these two product attributes were linearly related. The most acceptable chickpea snack was rated higher than a commercial corn snack. AS

Cowpeas

1816

Okechukwu (PE), Rao (MA), Ngoddy (PO) and McWatters (KH). **Rheology of sol-gel thermal transition in cowpea flour and starch slurry.** *Journal of Food Science* 56(6): 1991: 1744-1748

A thermal scanning rigidity monitor was used to follow rheological changes during heating of cowpea flour and starch slurries. The gelatinization temp. of cowpea starch was in the range 67 - 78 C. For cowpea flour, in addition to starch gelatinization, a shallow plateau was observed. The starch gelatinization onset temp. shifted from 67 C for starch to 72 C for 25% cowpea flour that contained 12 - 15% starch. The modulus (G') of cowpea gels increased with flour concn. according to a power relationship. Rigidity of the cowpea starch and flour gels decreased at temp. higher than 78 and 87 C, respectively. AS

Faba beans

1817

Amarowicz (R), Shimoyamada (M) and Okubo (K). **Application of reversed phase liquid chromatography in the analysis of saponins in faba bean.** *Die Nahrung* 35(2): 1991: 217-219

Lentils

1818

Tang (J), Sokhansangj (S) and Sosulski (F). **Determination of the breakage susceptibility of lentil seeds.** *Cereal Chemistry* 68(6): 1991: 647-650

The Tangential Abrasive Dehulling Device and the Stein Breakage Tester were compared as methods for assessing the susceptibility of lentil seeds to breakage. Seed moisture content, operating time, and machine adjustments were the variables. Both devices were able to differentiate breakage susceptibility of lentil seeds at appropriate moisture levels under proper operating conditions. The Tangential Abrasive Dehulling Device required less operating time (2 min) and smaller samples, but the Stein Breakage Tester provided more consistent results at an operation time of 4 min. In general, breakage susceptibility of lentil seeds increased with decrease in moisture content and temp. AS

Mung beans

1819

Ajay Singh and Padmakar. **Effect of ultraviolet radiation on nutritional quality of mung bean (*Vigna radiata* L.) seeds.** *Die Nahrung* 35(2): 1991: 215-216

OILSEEDS AND NUTS

1820

Chandrasekara (MR). **Miltone: Present status and future prospects.** *Indian Food Industry* 10(1): 1991: 26-28

This article discusses the process of extraction of miltone, a vegetable-toned milk designed to meet the nutritional requirements of small children and other vulnerable sections of the population by the use of groundnut flour and soybean which had its own advantages. The use of soymilk in the preparation of miltone, properties of soy milk - miltone, equipments required for the production of soy milk - miltone and its advantages are the aspects covered. CSA

Coconuts

1821

Ogundiya (MO). **Glucose content of nut water in four varieties of coconut palm (*Cocos nucifera*).** *Journal of the Science of Food and Agriculture* 56(3): 1991: 399-402

A significant variation in the glucose content of coconut water of the four var. (Nigerian Tall (NT), Nigerian Dwarf Green (NDG), NT x NDG and Malayan Dwarf Yellow (MDY)) and a positive and significant association between the nut wt. and glucose level of both NT x NDG and MDY was observed. GS

1822

Gopalakrishnan (N) and Thomas (PP). **Some observations on the microwave exposure of coconut products.** *Indian Coconut Journal* 22(4): 1991: 13-14

Partially defatted coconut, coconut cake and milk removed coconut gratings were exposed to microwaves to examine the colour variation and aroma generation. The results showed that microwave heating contributes to the removal of off-flavour from coconut cake and also plays a role in the generation of roasted coconut aroma in coconut cake and partially defatted coconut gratings whereas no roasted aroma was obtained from milk removed coconut gratings. CSA

Groundnuts

Groundnut milk

1823

Lee (C) and Beuchat (LR). **Functional and sensory properties of salad dressing containing fermented peanut milk.** *Journal of Food Science* 56(6); 1991; 1664-1667, 1684

Incorporation of fermented peanut milk (substitute for buttermilk) into ranch-style salad dressings prepared from 3 commercial brands of mixes resulted in decreased lightness, creamy flavour, oil emulsion capacity and consistency. Changes were dependent upon the commercial brand of dressing mix. Fermented peanut milk can be substituted for buttermilk in salad dressing at levels upto 25% without substantial reduction in sensory qualities. BV

Groundnut proteins

1824

Rustom (IYS), Lopez-Leiva (MH) and Nair (BM). **Optimization of extraction of peanut proteins with water by response surface methodology.** *Journal of Food Science* 56(6); 1991; 1660-1663

Water extraction of peanut proteins was optimized to maximize protein extraction, Y_1 and protein concn. in the extract, Y_2. A central composite design involving solids-to-water ratio (X_1, pH (X_2), temp. (X_3) and time (X_4) was used, and second-order models for Y_1 and Y_2 were employed to generate response surfaces. The optimum conditions to obtain Y_1 greater than or equal to 85% and Y_2 greater than or equal to 2.5% were $X_1 = 1{:}8$; $X_2 = 8.0$; X_3 - 50 C; $X_4 = 30$ min. Estimates of Y_1 and Y_2 at the optimum were 85.29% and 2.7%, respectively. Experimental verification gave values of $Y_1 = 84.39\%$ plus or minus 0.78 and $Y_2 = 2.80\%$ plus or minus 0.02. Y_1 and Y_2 were further maximized, as measured by absorbance of solution following centrifugation of the extract, when papain (0.05% g/g peanuts) was added and extraction was carried out at the optimum conditions. AS

Soybeans

1825

Che Man (YB), Wei (LS) and Nelson (AI). **Control of off-flavours of soybean extract by pH adjustment.** *ASEAN Food Journal* 6(3); 1991; 117-119

'Beany' and 'painty' off-flavours of soybean extract were eliminated by direct acid grinding at pH 3.0 - 3.8 using HCl, H_3PO_4 or tartaric acid. H_3PO_4 and tartaric acid treated soybean extract were more acceptable while samples treated in HCl, showed salty taste which was quite objectionable. BV

Soy products

Tofu

1826

Champagne (CP), Aurouze (B) and Goulet (G). **Inhibition of undesirable gas production in tofu.** *Journal of Food Science* 56(6); 1991; 1600-1603

Pasteurization was effective in lowering the bacterial counts, and retarded gas production in tofu. The addition of lactic acid (reducing pH to 5.5) or lactic acid bacteria (2×10^7 CFU/g) to tofu reduced gas production by about 50%. Addition of both lactic acid and *Lactobacillus plantarum* stopped gas production in contaminated tofu. BV

1827

Sun (N) and Breene (WM). **Calcium sulphate concentration influence on yield and quality of tofu from five soybean varieties.** *Journal of Food Science* 56(6); 1991; 1604-1607, 1610

A mini-process is described for making tofu from 50-g quantities of soybeans. It was used to compare yield and quality among 5 Minnesota grown var. (Vinton, Corsoy, Hardin, Stine 2510, Stine 2810) and to determine optimum concn. of the coagulant, $CaSO_4$. Product yield (wet basis), solids recovery, protein recovery and textural quality (Texture Profile Analysis hardness and fracturability) were optimal at 0.02 N $CaSO_4$ for all 5 var. Negative correlations were found between $CaSO_4$ concn. and both yield (r = -0.09 to 1.00) and protein recovery (r = -0.96 to 1.00) for all var. AS

Soy proteins

1828

Sorgentini (DA), Wagner (JR), Arrese (EL) and Anon (MC). **Water imbibing capacity of soy protein isolates: Influence of protein denaturation.** *Journal of Agricultural and Food Chemistry* 39(8); 1991; 1386-1391

In the present work the influence of the degree of protein denaturation and aggregation on water imbibing capacity (WIC) was studied. The results obtained show that the insoluble fraction of all isolates contributed the most to the WIC of the total isolate. This insoluble fraction is constituted by denaturated 11S and 7S proteins and some native 7S protein. WIC values of insoluble and soluble fractions are also influenced by the state of aggregation of their component proteins. AS

TUBERS AND VEGETABLES

Carrots

1829

Penner (MH) and Kim (S). **Nonstarch polysaccharide fractions of raw, processed and cooked carrots.** *Journal of Food Science* 56(6): 1991: 1593-1596, 1599

The total nonstarch polysaccharide (NSP) and soluble NSP components of raw, processed (canned and frozen) and home-cooked (boiled) Royal Chantenay carrots were analysed. Total NSP was composed of glucose (37%) and uronic acid (35%). Soluble NSP was composed of > 50% uronic acids. Processing and simulated home-cooking of raw carrots resulted in an increase in the amount of NSP/unit dry wt. Relative to raw carrots, cooking of canned product resulted in the largest (two fold) increase in total and soluble NSP/unit dry wt. Relative differences in NSP were not as great when compared on a wet wt. basis. AS

Cassava

1830

Obrein (GM), Taylor (AJ) and Poulter (NH). **Improved enzymic assay for cyanogens in fresh and processed cassava.** *Journal of the Science of Food and Agriculture* 56(3): 1991: 277-289

The assay for cassava cyanogens developed at the Natural Resources Institute has been modified to overcome some of the problems encountered when the assay is applied to cassava products. Inclusion of 25% ethanol in the extraction medium increased the volume of recovered extract from heat-processed cassava products, eliminated the need for centrifugation and did not interfere with any aspect of the assay. Greater cyanohydrin recovery was noted and the calculation for cyanogen contents was changed to take into account the total extract volume. The separate assay of the three cyanogens (glucosides, cyanohydrins and free cyanide) was achieved by buffering aliquots of the extract followed by appropriate treatment. The importance of assaying for free cyanide (HNC) at pH 4 was demonstrated. Above this pH, cyanohydrin degradation also produces free cyanide, giving rise to misleading values. The efficiency of the extraction medium in recovering added linamarin and cyanohydrin from cassava foods was determined. Recoveries of cyanohydrin were improved using the ethanol/acid medium. The stability of the cyanogens in the ethanol/acid extraction medium was tested at ambient and refrigeration temp. Over a two-month period, refrigerated extracts showed acceptable variation as compared with normal variation within the assay (5%) for total and non-glycosidic cyanogens but the levels of free cyanide showed heavy losses (15-56% loss). Since the relative toxicities of the three cyanogens have yet to be ascertained, the relative amount of each cyanogen may be important when assessing the safety of cassava products. AS

Garlic

1831

Agrawal (R), Mohanty (B), Singh (NS) and Patwardhan (MV). **Parameters affecting allicin formation as a secondary metabolite by static cultures of *Allium sativum*.** *Journal of the Science of Food and Agriculture* 57(2): 1991: 155-162

Garlic (*Allium sativum* L) bulb explants produced undifferentiated white globular callus when grown on MS medium having 2,4-dichlorophenoxyacetic acid (2,4-D) and Kinetin (Kn). Such callus when grown on medium having indole-3-yl-acetic acid (IAA) and/or Kn developed into the differentiating callus which had comparatively more allicin than that of undifferentiated callus. The effect of sucrose, NH_4^+ NO_3^- ratios and harmone concn. on growth and allicin development in the callus was investigated. There was a significant increase in allicin development in callus when grown for up to 4 wks on medium (a) having sucrose at 3% and 5% levels; (b) having NH_4^+ and NO_3^- ratios at 2:1 and 1:1 and (c) with Kn alone at a concn of 0.5 mg l^{-1}, which produced a tenfold increase in allicin content. AS

Potatoes

1832

Barichello (V), Yada (RY) and Coffin (RH). **Starch properties of various potato (*Solanum tuberosum* L) cultivars susceptible and resistant to low-temperature sweetening.** *Journal of the Science of Food and Agriculture* 56(3): 1991: 385-397

Differential scanning calorimetry (DSC) showed an increase in resistance to gelatinisation of isolated starch granules which correlated (r = 0.911) with higher chip scores following potato storage at 4 C and 12 C. The result indicate that the starch properties play a major role in low temp. sweetening of potatoes. Therefore, DSC allows early detection of cvs which could be 'non'chippers' following 4 C and/or 12 C storage. This technique may also be used in assessing different lots of potatoes of the same var. to determine which, after storage, are most likely to produce acceptably coloured chips. GS

1833

Biswal (RN) and Bozorgmehr (K). **Equilibrium data for osmotic concentration of potato in NaCl-water solution.** *Journal of Food Process Engineering* 14(4): 1991: 237-245

Equilibrium data needed in modelling of osmotic dehydration are reported for unblanched diced potato in contact with aqueous solutions of NaCl. Diced potato, 1 cm cubes, were equilibrated with 0 - 12% (w/w) aqueous NaCl sol. at 3 temp. (8, 21 and 35 C). The mass fraction of total solids nonsalt ($w^o{}_3$) in potato at equilibrium was modeled as a funtion of mass fraction of total solids in the fresh material at full turgor ($w^F{}_3$), concn. of NaCl in the external solution (w_m) and temp. Using $w^o{}_3$ and w_m, and assuming that the activity of NaCl in the potato tissue and the external solution at equilibrium are equal, equilibrium densities were calculated based on the principle of volume additivity. The predicted and experimentally measured equilibrium densities were in close agreement. AS

1834

Ruan (R), Schmidt (SJ), Schmidt (AR) and Litchfield (JB). **Nondestructive measurement of transient moisture profiles and the moisture diffusion coefficient in a potato during drying and absorption by NMR imaging.** *Journal of Food Process Engineering* 14(4): 1991: 297-313

A nondestructive method to measure the internal moisture distribution and to determine the effective moisture diffusion coefficient for a potato during drying and absorption was developed using NMR imaging and numerical modeling techniques. The coefficients obtained were 1.04 to 7.28×10^{-10} m^2/s, for moisture contents between 40% and 55% (wb), during drying with a sample temp. of 40 C; and were 9.78×10^{-12} to 2.33×10^{-11} m^2/s, for moisture contents between 56% and 60%, during absorption at 23 C. AS

1835

Bohac (JR). **A modified method to purify patatin from potato tubers.** *Journal of Agricultural and Food Chemistry* 39(8): 1991: 1411-1415

Patatin is a major potato tuber storage protein of approx. 40 kDa that exhibits esterase activity. A purification protocol was developed which involved the following: precipitation of the crude enzyme from potato extracts in stepwise extraction with 40 - 70% ammonium sulphate followed by chromatography of the most active fractions on Bio-Gel P-100 and of salt gradient fractions on DEAE-Sephacel and Con A-Sepharose. p-Nitrophenyl acetate (PNP acetate) and PNP laurate were used to determine the specific activity after each purification step. Enzymatic rates were linear during the assays and were much higher when PNP laurate was used as a substrate. Assay results revealed a 21-fold increase in specific activity of patatin from the crude extract compared to the extract from the Con A column. Preparative SDS-PAGE of the final extract revealed the low mol. wt. bands had been eliminated from Con A fraction. AS

Sweet potatoes

Sweet potato starch

1836

Kohyama (K) and Nishinari (K). **Effect of soluble sugars on gelatinization and retrogradation of sweet potato starch.** *Journal of Agricultural and Food Chemistry* 39(8): 1991: 1406-1410

The effect of water-soluble sugars contained in sweet potato on gelatinization and retrogradation of starch was studied by means of differential scanning calorimetry. Gelatinization peak temp. T_p and gelatinization enthalpy increased with increasing sugar concn. The shift of T_p to higher temp. was attributed to the stabilization of the crystalline region in starch and the immobilization of water by sugar molecules. The effect is larger in the order sucrose, glucose, fructose. All these sugars prevent retrogradation of sweet potato starch paste, and the order of effectiveness is the same as in the case of increase in gelatinization temp. The effect of sucrose concn. on T_p was explained by a zipper model approach. AS

Vegetables

1837

Bache (CA), Lisk (DJ) and Stoewsand (GS). **Cyclohexylamine residue in vegetables blanched with primary steam.** *Journal of Food Safety* 12(2): 1992: 161-166

Snap beans and green peppers blanched with steam containing cyclohexylamine (CHA) (a corrosion inhibitor for steam generation systems) showed presence of appreciable residues of CHA. The known toxicologic properties of CHA are reviewed and the need for further studies of possible food contamination or direct human exposure by other commonly used steam additives is emphasized. BV

1838

Diez (MJF). **Pickled fruits and vegetables.** *Grasas y Aceites* 42(1): 1991: 74-83 (Es)

Review. 26 references. BV

1839

Lee (YC). **Kimchi: The famous fermented vegetable product in Korea.** *Food Reviews International* 7(4): 1991: 399-415

This article reviews with emphasis on preparation of Kimchi (variety of Kimchi and taste of Kimchi), microorganisms involved in the fermentation, changes in the composition during ripening, methods to extend shelf-life and commercial production. 3 references. SRA

Brinjals

1840

Uday Kumar and Agarwal (HC). **Degradation of dithane M-45 residues in brinjals during cooking.** *Bulletin of Environmental Contamination and Toxicology* 47(5): 1991: 725-731

The amount of ethylene thiourea (ETU) in washed samples (brinjals) was 216.5 µg/g as compared to 1550 µg/g in case of unwashed samples. Cooking reduced the amount of ETU from 1550 µg to 342.9 µg/g in case of unwashed samples while in case of washed samples the amount of ETU decreased from 216.5 µg/g to 181.4 µg/g. BV

Brussels sprouts

1841

Bottcher (H). **Quality changes of brussels sprouts (*Brassica oleracea* L. gemmifera DC) during storage. Part. 1. External and sensory quality characteristics.** *Die Nahrung* 35(2): 1991: 169-178 (De)

During a test period of several years Brussels sprouts which have been stored without stems at 0 to +4 C revealed mainly linearly rising losses of fresh matter (at 0 C degressively) and by rotting (at 0 C progressively). The linear deterioration of the external quality is primarily expressed by yellowing of sprouts, occurring of rots on the stored sprouts and developing of bad smell. It is more drastic than the linear decrease of the sensory quality where flavour and odour are the decisive criteria. The influence of temp. was significant for all characteristics between the tested levels with the exception of the +4 C levels and outdoor-air ventilation (+0.5 ... +4 C). The annual growth and variety conditions come second in their effect on the storage result. In case of Brussels sprouts it is highly necessary that the material is quickly cooled down to temp. of less than or equal to 0 C immediately after harvesting. The shelf-life in dependence on temp. follows and exponential course according to the model function $y = \beta_1 e^{-c}\theta$ (θ = storage temp. in C, c = dimension figure for the speed of storability decrease). AS

1842

Bottcher (H). **Quality changes of brussels sprouts (*Brassica oleracea* L. *gemmifera* DC) during storage. Part 2. Nutritional quality.** *Die Nahrung* 35(2): 1991: 179-191 (De)

During several years of testing under the conditions of mechanical cooling (0 C and +4 C) and outdoor-air-ventilation (+0.5 ... 4 C) the effect of the storage period (x in storage days) on the shelf-life of Brussels sprouts stored without stems was studied. The respiration dynamic cause a linear decrease of the dry matter content and a mostly linear increase of dry matter losses in the product. The typical losses of vitamin C (ascorbic acid + dehydroascorbic acid) and total carotene rise linearly at lower temp., at +4 C however, they increase progressively ($y = \beta_1 x^2$). The share of dehydroascorbic acid in the total amount decreases slightly with the increase of storage time. Whereas monoglycerides show a typical transitory increase under the conditions ($y = \alpha + \beta_1 x - \beta_2 x^2$), disaccharides decrease retardantly at 0 C ($y = \alpha - \beta_1 x^3$) and linearly at higher temp. The content of titratable total acid rises linearly up to a level of 6.62 mmol/100g FM (= +23%). The great sensitiveness of Brussels sprouts to temp. is demonstrated by the significant gradations of the regression coeff. for changes from 0 to +4 C. this, however, does not generally refer to outdoor-air ventilation. Above that saccharides show a strong response to the annual growth conditions. Physiological relationships are discussed. AS

Leafy vegetables

Amaranthus

1843

Vargas-Lopez (JM), Paredes-Lopez (O) and Ramirez-Wong (B). **Physicochemical properties of extrusion-cooked amaranth under alkaline conditions.** *Cereal Chemistry* 69(6): 1991: 610-613

A Brabender extruder was used to study the effect of processing variables on the water absorption index (WAI), water solubility index (WSI), and masa hardness of alkaline-extruded amaranth flour. Extrusion variables studied were barrel temp. (50, 60 and 70 C), feed moisture content (20, 25 and 30%)

and screw speed (30, 45 and 60 r.p.m.). Regression analysis showed that changes in all response variables for amaranth flour were promoted by barrel temp. and feed moisture content. Screw speed in the evaluated range was significant for masa hardness. Polynomial equations obtained for each physicochemical property accounted for 86-93% of the total variation. In general, WAI values increased when the barrel temp. and feed moisture content were increased. WSI values decreased with increasing barrel temp. and feed moisture content. Higher masa hardness values were found at extreme values of barrel temp. and feed moisture content, whereas increasing moisture content and screw speed resulted in lower masa hardness values. Extrusion-cooked amaranth flour under alkaline conditions may be used for preparation of tortillas and tortilla-based products. AS

Cabbages

1844

Paakkonen (K) and Plit (L). **Equilibrium water content and the state of water in dehydrated white cabbage.** *Journal of Food Science* 56(6): 1991: 1597-1599

Lettuce

1845

Barriga (MI), Trachy (G), Willemot (C) and Simard (RE). **Microbial changes in shredded iceberg lettuce stored under controlled atmospheres.** *Journal of Food Science* 56(6): 1991: 1586-1588, 1599

Initial microbial populations in shredded Iceberg lettuce (*Lactuca sativa* L.) cv 'Great Lakes', were determined and their changes under different controlled atmospheres were studied. Lettuce was shredded, washed, disinfected, water rinsed and centrifuged before being stored for 12 days under air, 3% O_2, 3% O_2 + 5% CO_2 or 3% O_2 + 10% CO_2. Microbiological analysis and assessment of visual quality were carried out every 3 days. No human pathogens were found. Controlled atmospheres had little or no effect on the microbiological populations studied. A 3% O_2 + 10% CO_2 atmosphere maintained acceptable visual quality of lettuce, without appreciably affecting microbial development. AS

Tomatoes

1846

Dujaili (JA) and Anderson (RE). **Aciduric, pH-elevating *Bacillus* which cause noneffervescent spoilage of underprocessed tomatoes.** *Journal of Food Science* 56(6): 1991: 1611-1613

FRUITS

1847

Saxena (J) and Mehrotra (BS). **The occurrence of mycotoxins in some dry fruits retail marketed in Nainital district of India.** *Acta Alimentaria* 19(3): 1990: 221-224

Ten samples of marketed dry fruits were screened for various mycotoxins (aflatoxins, rubratoxin, ochratoxin A, citrinin, zearalenone and sterigmatocystin). It was found that percentage contamination by mycotoxins was highest in coconut (55.6%) and lowest in date palm (16.7%). Of all mycotoxins, aflatoxins were more common than others and in most of the samples the amount was found to be higher than the permissible limit for human consumption. However, the frequency of occurrence of other mycotoxins was considerably lower. AS

1848

Tantchev (SS), Malkki (Y), Pessa (E), Kinnunen (A) and Mokkila (M). **An absorption weighing method for determining the degree of enzymatic maceration in fruit and vegetables.** *Acta Alimentaria* 19(3): 1990: 261-271

1849

Watada (AE), Abe (K) and Yamuchi (N). **Physiological activities of partially processed fruits and vegetables.** *Food Technology* 44(5): 1990: 116, 118, 120-122

This article discusses the changes that takes place in the fruits and vegetables during the harvest stage, the injuries and wounds caused by the physical actions of partial processing, the textural changes, absorption of ethylene and loss of pigments which affect the physiological activities and subsequently the quality of produce. CSA

1850

Dougherty (RH). **Future prospects for processed fruit and vegetable products.** *Food Technology* 44(5): 1990: 124, 126

Various factors that must be considered for the future of processed fruits and vegetables such as demographics, consumer attitudes, processing and packaging, food distribution systems, raw materials for processing, environmental issues and globalization are discussed. CSA

1851

Zhang (SQ) and Matsuura (T). **Recovery and concentration of flavour compounds in apple essence by pervaporation.** *Journal of Food Process Engineering* 14(4): 1991: 291-296

Recovery and concn. of flavour compounds from an apple essence (x500) was attempted by pervaporation using a silicone rubber (polydimethylsiloxane) membrane at room temp. The flavour components were identified by GC-MS method, and the ratio of concn. of the flavour compound in the permeate to that in the feed was determined for each component. It was found that pervaporation is indeed an effective measure for the above purpose. Concn. ratios above 20 were achieved for flavour components with boiling points lower than 100 C. AS

1852

Scow (CC), Tan (SC) and Lim (SJ). **Production of firmer-textured canned and frozen tropical fruit and vegetables.** *ASEAN Food Journal* 6(3): 1991: 104-108

The effect of low temp. - long time blanching and conventional high temp. blanching on the canned and frozen tropical fruits (guava and papaya) and vegetables (clery, okra, winged beans, carrots and green beans) is studied. The optimum temp. for low-temp. (LTLT) blanching was found to vary with the type of material, ranging from 50 C for the fruits and 70 C for vegetables (bitter gourd). Addition of Ca to blanch water in LTLT blanching produced significantly firmer ($P < 0.01$) frozen carrots and green beans and had no significant effect ($P < 0.05$) on the firmness of frozen celery. Statistical analysis also showed no significant differences ($P < 0.05$) in drip loss between blanching treatments. SRA

1853

Abe (K) and Watada (AE). **Ethylene absorbent to maintain quality of lightly processed fruits and vegetables.** *Journal of Food Science* 56(6): 1991: 1589-1592

Ethylene had an undesirable effect on the quality of kiwifruits, bananas, broccoli, and spinach leaves that were prepared and stored as lightly processed products. A 2 or 20 p.p.m. ethylene treatment hastened the softening of the pulp of kiwifruits and bananas held at 20 C. Use of charcoal with palladium chloride, as ethylene absorbent, prevented the accumulation of the ethylene and was effective in reducing the rate of softening in kiwifruits and bananas and of chlorophylll loss in spinach leaves, but not in broccoli. AS

1854

Wiseman (JJ) and McDaniel (MR). **Modification of fruit flavours by aspartame and sucrose.** *Journal of Food Science* 56(6): 1991: 1668-1670

Power functions for fruitiness intensity of fruit flavoured (orange and strawberry) solutions unsweetened and sweetened with equi-sweet concn. of aspartame and sucrose were developed using nine experienced panel members to assess any modification of fruit flavour by sweeteners. Enhancement (at low flavour levels) of fruitiness was observed in the aspartame sweetened systems even though the power functions of both flavorants were lowered by the addition of aspartame. The enhancement was more pronounced in the orange flavoured system, suggesting a flavorant effect. AS

Breadfruits

1855

Bates (RP), graham (HD), Matthews (RF) and Clos (LR). **Breadfruit chips: Preparation, stability and acceptability.** *Journal of Food Science* 56(6): 1991: 1608-1610

A chip-type snack from breadfruit similar to potato, plantain, corn or cassava chips is reported in this paper. Mature breadfruit, sliced to 1.25 mm, fried in soybean oil at 165 C and salted to 1.5% produced a stable, crisp chip with lipid stability comparable to potato chips. Partial air-drying prior to frying reduced oil absorption form 42 to 26%. The product was acceptable similar to plantain or potato chips. In view of the extreme perishability and high postharvest losses of breadfruit, chip production represents a useful value-adding preservation method and alternative for this underutilized food resource. BV

Mangoes

1856

Chaplin (GR), McBride (RL), Aminah Abdullah and Nuevo (PA). **Sensory and physico-chemical quality of 'Kensington' mangoes after storage at low temperature.** *ASEAN Food Journal* 6(3): 1991: 109-113

Sensory panel found that external appearance, flesh colour, aroma, sweetness and general acceptability declined to unacceptable levels when fruits were stored for longer than 2 or 3 wks at 5 C and one wk at 1 C. Low temp. storage increased acid content and decreased sweetness of mangoes. No commercial value was observed for constant temp. storage of mangoes at temp. lower than 10 C. SRA

Strawberries

1857

Ghaouth (AE), Arul (J), Ponnampalam (R) and Boulet (M). **Chitosan coating effect on storability and quality of fresh strawberries.** *Journal of Food Science* 56(6); 1991; 1618-1620, 1631

The effect of chitosan coating (1.0 and 1.5% w/v) in controlling decay of strawberries at 13 C was investigated as compared to a fungicide, iprodione (Rovral). Chitosan coating significantly reduced a decay of berries (P less than or equal to 0.05) compared to the control. There was no significant difference between chitosan and fungicide treatments up to 21 days storage. Thereafter, Rovral-treated berries decayed at a higher rate than chitosan-coated berries. Chitosan-coated berries stored at 4 C were firmer, higher in titratable acidity, and synthesized anthocyanin at a slower rate than Rovral-treated or nontreated berries. Chitosan coating decreased respiration rate of the berries with a greater effect at higher concn. AS

1858

Guichard (E), Issanchou (S), Descourvieres (A) and Etievant (P). **Pectin concentration, molecular weight and degree of esterification: Influence on volatile composition and sensory characteristics of strawberry jam.** *Journal of Food Science* 56(6); 1991; 1621-1627

Composition of headspace, consistency, taste and flavour characteristics were determined in jams made with different pectins. At usual concn., high methoxylated pectin induced an undesirable modification of typical flavour and intensity of flavour and taste, whereas low methoxylated pectin induced few alterations. At fixed concn. and mol. wt., a decrease in degree of esterification produced a significant decrease in consistency and noticeable modifications of the flavour perception and headspace composition, but no taste alteration. Mechanical reduction of pectin mol. wt. significantly modified only the consistency. AS

CONFECTIONERY, STARCH AND SUGAR

1859

Roos (Y) and Karel (M). **Water and molecular weight effects on glass transitions in amorphous carbohydrates and carbohydrates solutions.** *Journal of Food Science* 56(6); 1991; 1676-1681

The effects of water, freeze-concn. and effective mol. wt. (M_e) on glass transition (T_g) of maltose and maltodextrins were studied, and methods to predict T_g were used to establish state diagrams. T_g of maximally freeze-concentrated solutes (T'_g) and onset of ice melting (T'_m) increased with M_e, and for high mol. wt. polysaccharides T'_g and T'_m were predicted to have the same temp. value. Ice formation at $T'_g < T < T'_m$ was time dependent. Unfrozen water in maximally freeze-conc. matrices was about 20% independently of M_e. The state diagrams can be used to evaluate physical state of frozen and dehydrated foods. AS

Confectionery

Chocolates

1860

Hurrell (RF), Reddy (MB), Dassenko (SA), Cook (JD) and Shepherd (D). **Ferrous fumarate fortification of chocolate drink powder.** *British Journal of Nutrition* 65(2); 1991; 271-283

The usefulness of ferrous fumarate as an iron fortificant for an experimental chocolate drink powder targetted to children and adolescents is evaluated in this study. The study showed that chocolate drink powders fortified with ferric pyrophosphate and reconstituted with cold, hot (80°) and boiling water or milk were acceptable with respect to colour and taste. The ferrous fumarate fortified products reconstituted in similar conditions, changed colour from red/brown to an unacceptable grey. When the Fe compounds were added to chocolate drink before consumption, the adsorption of ferrous fumarate was 3.31%, ferrous sulphate was 2.82% and ferric pyrophosphate was 2.11%. Whereas the absorption of ferrous fumurate was 5.27%, ferrous sulphate 2.62% and ferric pyrophosphate 0.55%, when the Fe compounds were processed during the manufacture of chocolate drinking powder. This study suggests that in the absence of food, one glass of chocolate milk drink will furnish approx. 0.5 mg absorbable Fe serving. Two glasses/day, would cover a substantial part of Fe requirement. SRA

Sugar

Jaggery

1861

Patil (JP) and Shingte (AK). **Effect of application of phosphorus and potassium to sugarcane crop and its effect on quality of jaggery. Part II.** *Indian Sugar* 42(1); 1992; 13-18

Experiments were conducted at the College of Agriculture, Kolhapur (Maharastra) in the year 1982-83 and 1983-84 using Co 740 sugarcane var.

in factorial block design with 3 replications using 4 levels each of P_2O_5 (0, 55, 110 and 165 Kg/ha) and K_2O (0, 55, 110 and 165 Kg/ha). The cane was analysed at 10 and 11 months age and at harvest. Application of P_2O_5 in all the 4 levels did not affect the ash content, pH, lead number, purity coeff. and net rendement of jaggery significantly at 10, 11 months and at harvest during both the yr. Application of K_2O at 165 Kg/ha gave higher ash content, purity coeff. and net rendements of jaggery in both seasons at 11 months and at harvest. SRA

BAKERY PRODUCTS

Bread

1862

Kou (Y) and Chinachoti (P). **Structural damage in bread staling as detected by recoverable work stress-strain model analysis.** *Cereal Foods World* 36(10); 1991; 888-892

Recoverable work and stress-strain relationship of bread crumb were studied during storage. A typical stress-strain sigmoidal curve for solid foams was observed. Nonlinear curve-fitting analysis gave three constants, C_1, C_2 and C_3, which changed over a storage period. During 8 days of storage, C_1 increased 4 times, C_2 decreased one half, and C_3 decreased only slightly. Bread that had been precompressed (compacted up to 50% gave a stress-strain curve with a decreased C_1, in C_3 as compared with an uncompacted bread. This was due to the damage of the cellular structure and an increase in relative density due to the precompaction. The percent recoverable work decreased significantly with an increased degree of deformation and storage time. The recoverable work increased curvilinearly with moisture content and rh, depending on the degree of deformation. AS

1863

Addo (K) and Pomeranz (Y). **Lipid binding and fatty acid distribution in flour, dough and baked and steamed bread.** *Cereal Chemistry* 68(6); 1991; 570-572

Lipid binding and fatty acid distribution were determined in flour, mixed dough and crumb of baked or steamed bread. Dough mixing, baking and steaming of the original flours reduced extractability of free (petroleum-ether extractable) flour lipids. No significant difference was found in the extent of lipid binding in native flour as a result of baking and steaming. In experiments with untreated flour, shortening lipids were bound during baking or steaming but not during dough mixing. In experiments with petroleum-ether defatted flour, shortening lipids were also bound in the dough. Flour lipids were bound in preference to shortening lipids. Protein content was apparently not the only factor associated with degree of lipid binding. More unsaturated oils than saturated fats became bound during dough mixing and baking. In untreated flour supplemented with 2% shortening, baking and steaming resulted in more binding of saturated fats and unsaturated oils than dough mixing did. In defatted flour, the binding of unsaturated oils increased in order of dough mixing, baking and steaming. In general, steaming resulted in more shortening binding than baking did. AS

1864

Zanoni (B), Smaldone (D) and Schiraldi (A). **Starch gelatinization in chemically leavened bread baking.** *Journal of Food Science* 56(6); 1991; 1702-1706

Differential scanning calorimetry was employed to assess the kinetics of the starch gelatinization in bread doughs. The process of gelatinization, which depended on the depth from the surface of the sample, followed the same first order kinetics in the baking treatment and in the calorimetric scan. Its progress was predictable when the local temp. could be suitably recorded. Accordingly, thorough temp. control allowed monitoring starch gelatinization and bread baking. AS

Cookies

1865

Gonzalez-Galan (A), Wang (SH), Sgarbieri (VC) and Moraes (MAC). **Sensory and nutritional properties of cookies based on wheat-rice-soybean flours baked in a microwave oven.** *Journal of Food Science* 56(6); 1991; 1699-1701, 1706

Cookies prepared with a blended flour of 50% wheat, 40% brown rice and 10% defatted soy flours or 35% broken rice and 15% defatted soy flours, baked in a microwave oven (2450 MHz) for 240 s were rated as the best of 6 formulas to produce cookies with good sensory properties, acceptability and adequate nutritive quality. BV

Dough

1866

Inoue (Y) and Bushuk (W). **Studies on frozen doughs. I. Effects of frozen storage and freeze-thaw cycles on baking and rheological properties.** *Cereal Chemistry* 68(6); 1991; 627-631

The effects of frozen storage for one wk and of freeze-thaw cycles during the storage period on rheological and baking properties of yeasted dough were studied. Two oxidant additions (ascorbic acid without and with potassium bromate) were used. A modified extensigraph procedure was used to measure the stretching properties of fermented doughs. Extensigraph resistance of thawed doughs decreased significantly after frozen storage for one wk and with an increasing number of freeze-thaw cycles. A highly significant positive correlation was obtained between loaf volume and max extensigraph resistance ($r = 0.935 - 0.976$, $P < 0.05$), and a highly significant negative correlation was obtained between final proof time to a fixed height and max resistance ($r = -0.969 - -0.987$, $P < 0.05$). A combination of ascorbic acid and potassium bromate, compared with ascorbic acid alone, strengthened the doughs and improved the baking potential of frozen dough. This result indicated that freeze damage to dough was dependent on the strength of the original dough. On the other hand, extensigraph resistance of nonyeasted doughs did not change after the first freeze-thaw cycle but decreased incrementally after the second and third cycles. Comparison of the extensigraph results for yeasted and nonyeasted doughs suggests that the gluten structure of yeasted doughs may be more vulnerable to the effect of freezing (e.g., ice crystallization) than that of nonyeasted doughs. AS

1867

Lorimer (NL), Zabik (ME), Harte (JB), Stachiw (NC) and Uebersax (MA). **Navy bean flour fractions in composite doughs: Effect of bean grade on rheology parameters and microstructure of wheat dough.** *Cereal Chemistry* 68(6): 1991: 636-641

To increase the economic feasibility of producing dry-roasted, air-classified legume flour fractions for use in composite flours, the effect of using prime and cull navy beans to produce high protein flours (fines) and cotyledon flours was investigated. These flours were used to produce wheat flour-bean composite doughs (at ratios of 95:5 and 90:10) for farinograph and low-temp. scanning electron microscopic microstructural evaluation. Composite flours with increased protein exhibited the expected increase in absorption, delay in arrival and peak time, and reduction in stability. An exception to this was the composite flour containing 5% prime navy bean fines. The stabilities of composites containing high protien fines were greater than those containing cotyledon flour. Bean grade produced few significant differences in farinograph parameters. For composites with 10% cull fines, absorption was higher, whereas arrival and peak times were significantly shorter. Microstructures of wheat-bean flour blend evaluations differed from those of the control (100% wheat flour) for all variables. No differences in farinograph parameters due to bean grade were found for any composites containing cotyledon flour. The microstructure of composites with cotyledon flour from cull beans showed slightly greater gluten disruption than was evident in the doughs from the wheat-prime cotyledon composites. AS

Pasta

1868

Riva (M), Piazza (L) and Schiraldi (A). **Starch gelatinization in pasta cooking: Differential flux calorimetry investigations.** *Cereal Chemistry* 68(6): 1991: 622-627

Pasta cooking conditions were simulated in a differential flux calorimeter. The profile of the endothermic starch gelatinization peak was observed to directly describe the process according to first-order kinetics. An early small exothermic effect was attributed to wetting. Isothermal calorimetry provides much more reliable results than do other traditional approaches, and it allows comparison among different kinds of pasta. This work gives a detailed presentation of the physical meaning underlying the calorimetric trace, which allows assessment of the gelatinization kinetics and simple thermodynamic treatment. AS

Tortillas

1869

Serna-Saldivar (SO), Rooney (LW) and Greene (LW). **Effect of lime treatment on the availability of calcium in diets of tortillas and beans: Rat growth and balance studies.** *Cereal Chemistry* 68(6): 1991: 565-570

Quality protein maize (QPM), regular corn, and sorghum were lime-cooked (with CaO) and processed into tortillas. Weanling rats were fed raw grain or tortilla-based diets supplemented with dry, cooked pinto beans and a Ca-free or Ca-rich maneral premix. Processing raw grains into tortillas increased the Ca content from 11 to 163 mg/100 g. The raw grain and tortillas from QPM contained 53% more lysine than did raw grains and tortillas from regular corn and sorghum. Rats consuming Ca-supplemented QPM products consumed more feed and gained more wt. but had feed conversion ratios similar to those of their counterparts fed regular corn and sorghum. Rats fed raw grains not supplemented with Ca consumed less feed, gained less wt., and had poorer feed conversion ratios than did their counterparts fed Ca-supplemented diets. The negative effect of the lack of Ca was more noticeable as the experiment progressed. The Ca from tortillas was highly available because rats fed tortilla apparently absorbed and retained more Ca than did rats fed unsuplemented raw grains. Rats fed tortilla diets supplemented with Ca had the poorest apparent P absorption and retention values. AS

MILK AND DAIRY PRODUCTS

1870

Kapil (V), Dodeja (AK) and Sarma (SC). **Lactose manufacture from whey - Engineering solutions.** *Indian Food Industry* 9(2): 1990: 27-32

This article deals with the economic utilization of whey in the manufacture of lactose using scraped surface heat exchanger. Uses of lactose, the manufacturing process of lactose which involves deproteinization of whey, concn., crystallization; harvesting of lactose crystals and refining of lactose are also discussed. CSA

Milk

1871

Hagrass (AEA), Fayed (EO), Aly (AA) and El-Samragy (YA). **Growth characteristics of enterococci isolated from Laban Rayeb.** *Die Nahrung* 35(2): 1991: 209-213

Eleven strains of *Enterococcus* (*Streptococcus*) *faecalis* isolated form Laban Rayeb, a type of fermented milk, had been studied when grew in milk. *Enterococcus* (*Streptococcus*) *faecalis* strains 19 and 22 were the most active strains in the production of lactic acid, acetaldehyde and diacetyl. Both strains exhibited a high proteolytic activity besides a good clean flavour. Based on the obtained results, *Enterococcus* (*Streptococcus*) *faecalis* 19 and 22 could be used to bring about the lactic fermentation during the manufacture of some cultured dairy products. AS

1872

Bora (K), Singh (J) and Goyal (GK). **Changes in physico-chemical properties of goat milk due to boiling and simmering processes.** *Indian Journal of Animal Science* 60(1): 1991: 112-114

Simmering of goat milk increased the viscosity (21.66%), decreased the curd tension (36.03%). Titratable acidity increased by 6.5%. pH of goat milk decreased slightly due to boiling and simmering processes. No effect was observed on sp. gr. and fat content due to boiling or simmering processes. Total solids (0.13%) and thiobarbituric acid value increased due to simmering. Total reducing capacity of goat milk increased by 10.32 and 17.41% in respect of boiled and simmered samples. BV

1873

Singh (RG), Singh (K) and Ogra (JL). **Studies on the lactic acid cultures for the preparation of *Dahi* from goat milk.** *Indian Journal of Dairy Science* 44(10): 1991: 620-623

Dahi was prepared from the milk of different breeds of goat and starter cultures. Good *dahi* was made from the milk of Black Bengal followed by Jamunapari, Barbari and Beetal breeds of goats. The best starter cultures at one percent concn. for *dahi* making from the milk of Jamunapari and Black Bengal were *Streptococcus paracitrovorus*, *S. lactis* and *Lactobacillus casei* for Beetal while for Barbari milk were *L. bulgaricus*, *S. cirovorus* and *L. acidophilus*. Boiling of goat milk (25% T.S.) gave better *dahi* than pasteurization treatment. However, increasing of total solids to 20% in raw milk also gave better *dahi* from the milk for all the breeds of goat. AS

1874

Alvarez De Felipe (AI), Melcon (B) and Zapico (J). **Structural changes in sweetened condensed milk during storage: An electron microscopy study.** *Journal of Dairy Research* 58(3): 1991: 337-344

This work aimed to relate changes in rheological behaviour with structural details of different sweetened condensed milk samples as well as to clarify the role of additives in delaying gelation. To study the process of gelation, rheological techniques were applied to fresh and stored condensed milk samples for times and at temp. known to favour gelation (45 days at 37 C). Electron microscopy techniques were used to relate the rheological changes with observed structural details. Examination by electron microscopy showed that micellar aggregation and association of casein micelles with fat globules increased during storage. The whey proteins appeared to play an important role in the thickening process. AS

Milk products

Cheese

1875

Cavalier-Salou (C) and Cheftel (JC). **Emulsifying salts influence on characteristics of cheese analogs from calcium caseinate.** *Journal of Food Science* 56(6): 1991: 1542-1547, 1551

Cheese analogs were prepared from calcium caseinate, butter oil and emulsifying sodium salts (ES). Increasing ES levels gave cheese analogs with higher pH, degree of casein dissociation and degree of fat emulsification than the control without ES. Firmness of cheese analogs first increased, then decreased when the ES level was increased from 1 to 3%. Effects depended on the degree of polymerization of phosphate salts. Sodium citrate (> 1%) or Na_2HPO_4 (> 2%) made cheese analogs more able to melt upon reheating. Melting ability correlated with high pH, soft texture, high degree of casein dissociation and low degree of fat emulsification. AS

1876

Zorrilla (SE) and Rubiolo (AC). **Average NaCl concentration in cheese for different volume ratios of brine and solid during salting.** *Journal of Food Science* 56(6): 1991: 1548-1551

Fick's second law for unsteady-state, one-dimensional diffusion in solid media from a well stirred solution of limited volume was used to develop mathematical equations for modelling the mass transfer of NaCl in cheeses during salting. A computational method was employed to solve the equations and analyze the suitable conditions for salt penetration in finite cylindrical cheese. Various volume ratios of solution and solid were considered to determine the variation of NaCl concn. in cheeses. Experimental results were predicted by the proposed mathematical model with < 10% error. AS

Cheddar cheese

1877

Kanawjia (SK) and Singh (S). **Effect of *Lactobacillus casei* and protease (*Aspergillus oryzae*) on enhancement of flavour and biochemical changes in buffalo milk Cheddar cheese.** *Indian Journal of Dairy Science* 44(10): 1991: 639-642

Attempts were made to accelerate the ripening of Cheddar cheese from buffalo milk, *L. casei* and protease (*Aspergillus oryzae*). Cheese was made with 0.50% *L. casei* and 2% lactic culture. Protease, 0.005, 0.010 and 0.025% (w/w) of curd) was mixed with salt and then added to milled Cheddar curd. The flavour development and biochemical changes in experimental cheese were faster than that of control. Due to synergistic effect of *L. casei* and protease quite as acceptable quality cheese could be obtained within 6 months of curing. AS

Ghee

1878

Sree Sree (P) and Lal (D). **Stability of butylated hydroxy toulene (BHT) and butylated hydroxy anisole (BHA) during clarification of butter into ghee and its subsequent storage.** *Indian Journal of Animal Science* 60(1): 1991: 86-89

The effect of addition of BHT alone at 50, 100 and 200 p.p.m., and also that of BHT and BHA in 1:1 combination at 100 and 200 p.p.m. to butter on their stability during conversion into ghee and then during subsequent storage was studied. The stability of the antioxidants decreased during clarification of butter into ghee and also during its subsequent storage. Higher the concn. greater was the stability. The stability of BHT increased slightly in the presence of BHA. AS

Ice cream

1879

Zanotti (MR) and Pagani (M). **Methods of solid impurity determination in ice creams without added raw materials.** *Industrie Alimentari* 30(289): 1991: 9-11, 14 (It)

1880

Bray (F). **Technology of fat-free ice cream.** *Industrie Alimentari* 30(290): 1991: 117-119 (It)

This paper describes where on-line denaturation of mixture of whey and milk protein are obtained prior to further mixing of standard ice cream ingredients, followed by their final processing. The resulting protein-protein-water aggregations the fat structure and the final fat-free ice cream results with rheological features similar to the standard product which contains 8% fat. BV

Khoa

1881

Manisha Sapre and Deodhar (AD). **Effect of *Khoa* preparation from buffalo milk on protein quality.** *Indian Journal of Dairy Science* 44(10): 1991: 624-628

The changes in nutritional value of milk proteins on heat concn. of milk during *khoa* preparation was studied. *Khoa* was prepared from standardized buffalo milk (5% fat) by heating with super heated steam at 100-105 C and 1.406 kg/cm pressure. Samples were taken at initial (milk), intermediate (*dhap*) and final (*khoa*) stages for analysis. Proximate composition and lysine content were analysed by chemical methods. With progressive decrease in the moisture content from 87.9 plus or minus 0.31% to 35.6 plus or minus 0.63%, protein content increased from 4.1 plus or minus 0.12% to 19.8 plus or minus 0.12%; fat from 5.0 plus or minus 0.01% to 22.3 plus or minus 0.12%; and lactose from 4.4 plus or minus 0.05% to 21.0 plus or minus 0.24%. The total lysine content in the final product was almost the same as in milk. In the biological evaluation using albino rats, small but significant increase in net protein utilization (NPU) and net protein ratio (NPR) was observed. It was concluded that nutritional value of milk proteins does not decrease during *khoa* preparation, and was an indication that the limiting aminoacids were not heat affected. The increase in protein quality indices was attributed to the possible salutary effect of high lactose content in *dhap* and *khoa*, relative to standardized milk. AS

1882

Sawhney (IK), Patil (GR) and Kumar (B). **Effect of temperature on the moisture sorption isotherms of a heat-treated whole milk product, *khoa*.** *Journal of Dairy Research* 58(3): 1991; 329-335

Mositure sorption isotherms of khoa were determined at 15, 25, 35 and 45 C over a a_w range of 0.11 - 0.97. The isotherms were sigmoid (Type II) and were fitted to the Guggenheim-Anderson-de-Boer (GAB) equation (Bizot, 1983). The a_w of freshly made khoa was found to be 0.96. The a_w of khoa increased with increasing temp. up to 0.9; above this the effect of temp. on a_w diminished. The monolayer moisture content of khoa decreased with increasing temp. The equations describing the temp. dependence of GAB constants were determined in the form of the Clausius-Clapeyron equation. The net isosteric heat of desorption of khoa decreased rapidly until a moisture level of 0.1 g/g solids and approached a constant value of 0.43 kJ/mol above a moisture level of 0.25 g/g solids. AS

Milk powder

1883

Barraquio (VL) and Van De Voort (FR). **Sodium caseinate from skim milk powder by extrusion processing: Physicochemical and functional properties.** *Journal of Food Science* 56(6): 1991: 1552-1556, 1561

Sodium caseinate produced on a pilot-plant-scale directly from skim milk powder (SMP) with two-step extrusion process was compared to a commercial product and a sodium caseinate prepared from commercial acid casein by extrusion-processing. The products were compared in terms of physicochemical properties and functional properties, as well as microbiological quality. Although differences existed between the caseinates, overall, those produced from SMP by extrusion appeared comparable to commercial caseinate. Results indicate that a good-quality sodium caseinate with the requisite properties normally associated with commercial sodium caseinate could be produced directly from SMP by extrusion-processing. AS

Wheys

Whey proteins

1884

Padua (GW), Richardson (SJ) and Steinberg (MP). **Water associated with whey protein investigated by pulsed NMR.** *Journal of Food Science* 56(6): 1991: 1557-1561

Proton longitudinal relaxation rates were determined for whey protein powders and suspensions of solids concn. between 0.01 and 2.0 g solids/g water. Data showed 3 hydration regions. The relationship between relaxation rate and solids content was investigated for each region. The two-state model with fast exchange was applied to the dilute suspensions and the high-solids regions. This allowed identification of polymer water and free water states in dilute suspensions and also identification of polymer water and capillary water in high-solids preparations. For intermediate-solids mixtures the two-state model was extended to three water states: polymer, capillary and free. These models enabled calculation of the amount of each water state associated with whey protein at a given moisture content. AS

Yoghurts

1885

Vedamuthu (ER). **The yoghurt story - past, present and future. Part V.** *Dairy, Food and Environmental Sanitation* 11(8): 1991; 444-446

Aspects covered include body of yoghurt, texture in yoghurt, flavour in plain yoghurt and flavour control in fruit and flavoured yoghurts. BV

Milk proteins

Caseins

1886

McGookin (BJ) and Augustin (M-A). **Antioxidant activity of casein and Maillard reaction products from casein-sugar mixtures.** *Journal of Dairy Research* 58(3): 1991; 313-320

The antioxidant activity of casein and Maillard reaction products obtained by reaction of casein with glucose or lactose was studied. Antioxidant activity was evaluated in a model system containing methyl linoleate with haemoglobin as a pro-oxidant.

Casein was antioxidative and heating casein in the presence of glucose or lactose resulted in enhancement of antioxidant activity. The development of antioxidant activity in reacted casein-sugar mixtures was determined as a function of initial casein and sugar concn. The observed antioxidant activity of reacted casein-sugar mixtures was due to casein itself and Maillard reaction products resulting from reacting casein with sugar. AS

MEAT AND POULTRY

1887

Beltran (JA), Bonnet (M) and Ouali (A). **Collagenase effect on thermal denaturation of intramuscular collagen.** *Journal of Food Science* 56(6): 1991: 1497-1499

1888

Shahidi (F) and Pegg (RB). **Encapsulation of the pre-formed cooked cured-meat pigment.** *Journal of Food Science* 56(6): 1991: 1500-1504, 1518

Meat

1889

Bedinghaus (AJ) and Ockerman (HW). **Temperature, pH and bacterial populations of meat as influenced by home freezer failure.** *Journal of Food Science* 56(6): 1991: 1508-1510

The fate of frozen meat products (beef or pork) in home freezers when electrical power is interrupted is investigated. 14 packed meat (beef 3 and pork 11) samples with varying trial load wts (range = 43 - 128 kg) were frozen and power was disconnected. The packages within each lot were analysed daily for 9 days for temp., microbial count, and pH. After about 36 h without electrical power, the bacterial populations reached log 6 in the frozen samples. Thus it would not be advisable to use the meat held for 36 h after electrical power failure. BV

1890

Tsen (H-Y), Wang (S-J) and Green (SS). ***Salmonella* detection in meat and fish by membrane hybridization with chromogenic/phosphatase/biotin DNA probe.** *Journal of Food Science* 56(6): 1991: 1519-1523

1891

Ibrahim (A) and Mac Rae (IC). **Isolation of *Yersinia enterocolitica* and related species from red meat and milk.** *Journal of Food Science* 56(6): 1991: 1524-1526

Beef

1892

Hajduk (E) and Fik (M). **Application of glycerol to freezing bovine pancreas. Part 2. Effects of glycerol and grinding on frozen pancreas quality.** *Die Nahrung* 35(2): 1991: 127-132

1893

Anderson (ME), Marshall (RT) and Dickson (JS). **Efficacies of acetic, lactic and two mixed acids in reducing numbers of bacteria on surfaces of lean meat.** *Journal of Food Safety* 12(2): 1992: 139-147

1894

Chen (CM) and Trout (GR). **Sensory, instrumental texture profile and cooking properties of restructured beef steaks made with various binders.** *Journal of Food Science* 56(6): 1991: 1457-1460

1895

Chen (CM) and Trout (GR). **Colour and its stability in restructured beef steaks during frozen storage: Effects of various binders.** *Journal of Food Science* 56(6): 1991: 1461-1464, 1475

1896

Lanari (MC) and Cassens (RG). **Mitochondrial activity and beef muscle colour stability.** *Journal of Food Science* 56(6): 1991: 1476-1479

1897

Arganosa (GC), Godber (JS), Tanchotikul (U), McMillin (KW) and Shao (KP). **Processing ingredients affecting oxidative and textural stability of restructured beef roasts.** *Journal of Food Science* 56(6): 1991: 1480-1483, 1496

1898

Ahmed (PO), Miller (MF), Young (LL) and Reagan (JO). **Hot-fat trimming and electrical stimulation effects on beef quality.** *Journal of Food Science* 56(6): 1991: 1484-1488, 1499

1899

Mitsumoto (M), Cassens (RG), Schaefer (DM), Arnold (RN) and Scheller (KK). **Improvement of colour and lipid stability in beef *Longissimus* with dietary vitamin E and vitamin C dip treatment.** *Journal of Food Science* 56(6): 1991: 1489-1492

1900

Mitsumoto (M), Maeda (S), Mitsuhashi (T) and Ozawa (S). **Near-infrared spectroscopy**

determination of physical and chemical characteristics in beef cuts. *Journal of Food Science* 56(6): 1991: 1493-1496

Pork

1901

Hortin (AE), Bechtel (PJ) and Baker (DH). **Efficacy of pork loin as a source of zinc and effect of added cysteine on zinc bioavailability.** *Journal of Food Science* 56(6): 1991: 1505-1507

1902

Lamkey (JW), Mandigo (RW) and Calkins (CR). **Preblending hot- and cold-boned pork at different particle sizes.** *Journal of Food Science* 56(6): 1991: 1511-1513

Products

Hams

1903

Plimpton (RFJr), Perkins (CJ), Sefton (TL), Cahill (VR) and Ockerman (HW). **Rigor condition, tumbling and salt level influence on physical, chemical and quality characteristics of cured, boneless hams.** *Journal of Food Science* 56(6): 1991: 1514-1518

Patties

1904

Bielken (SL), Eadie (LM), Griffiths (I), Jones (PN) and Harris (PV). **Assessment of the textural quality of meat patties: Correlation of instrumental and sensory attributes.** *Journal of Food Science* 56(6): 1991: 1465-1469, 1475

1905

Beilken (SL), Eadie (I), Griffiths (I), Jones (PN) and Harris (PV). **Assessment of the sensory characteristics of meat patties.** *Journal of Food Science* 56(6): 1991: 1470-1475

Poultry

1906

Opiacha (JO), Mast (MG) and MacNeil (JH). **In-vitro protein digestibility of dehydrated protein extract from poultry bone residue.** *Journal of Food Science* 56(6): 1991: 1751-1752

Digestibility of the dehydrated protein extract from poultry bone residue was significantly ($P < 0.05$) lower than chicken breast muscle or mechanically deboned poultry. Digestibility of the spray-dried extracts was about 3% higher than freeze-dried extracts. BV

Chickens

1907

Young (LL), Gracia (JM), Lillard (HS), Lyon (CE) and Papa (CM). **Fat content effects on yield, quality and microbiological characteristics of chicken patties.** *Journal of Food Science* 56(6): 1991: 1527-1528, 1541

Chicken thigh meat patties (CTMP) with 5, 10, 15 and 20% levels of fat were evaluated for Hunter color values, drip and cooking losses, proximate composition, texture profiles and rates of microbial spoilage. Raw CTMP became lighter and more yellow as fat content increased but cooking obscured these trends. As fat content increased, cooking losses and moisture:protein ratios increased. CTMP with lower fat level were harder, springier, less cohesive and chewier. Rates of bacterial spoilage were unaffected by fat content. BV

Turkeys

1908

Craig (J), Bowers (JA) and Seib (P). **Sodium tripolyphosphate and sodium ascorbate monophosphate as inhibitors of off-flavour development in cooked, vacuum-packaged, frozen turkey.** *Journal of Food Science* 56(6): 1991: 1529-1531, 1561

Products

Eggs

1909

Singh (RP) and Panda (B). **Comparative study on some quality attributes of quail and chicken eggs during storage.** *Indian Journal of Animal Science* 60(1): 1991: 114-117

Quail eggs are susceptible to quality deterioration as chicken eggs at ambient temp. (32 plus or minus 2 C). However, the decline in the quality of quail eggs in terms of albumen and yolk indices and percentage of thick white was found to be less than those of chicken eggs under refrigerated (5 plus or minus 1 C) storage. AS

1910

Arntfield (SD), Murray (ED) and Ismond (MAH). **Role of disulphide bonds in determining the rheological and microstructural properties of**

heat-induced protein networks from ovalbumin and vicilin. *Journal of Agricultural and Food Chemistry* 39(8): 1991: 1378-1385

The involvement of disulphide bonds in heat-induced networks from ovalbumin and vicilin was investigated by incorporating cysteine hydrochloride (CysHCl), mercaptoethanol (ME), and N-ethylmaleimide (NEM) during network formation. Network evaluation was based on rheological properties (small amplitude oscillatory testing) and microstructure (light microscopy). Low G' (storage) and G" (loss) moduli, elevated tan δ (G"/G') values, and a reduction in protein cross-linking at ME and NEM concn. of 25 and 50 mM supported disulphide bond involvement in ovalbumin networks. The impact of these reagents was seen during the final stage of cooling. Vicilin networks were unaffected by these reagents, indicating no disulphide bond involvement. While disulphide bonds may contribute to the elasticity and strength of a protein network, noncovalent forces are key to initial network formation. AS

1911

Causeret (D), Matringe (E) and Lorient (D). **Ionic strength and pH effects on composition and microstructure of yolk granules.** *Journal of Food Science* 56(6): 1991: 1532-1536

The microstructure of hen egg granules was investigated. Polyacrylamide gel electrophoresis revealed that the granules consisted of 3 proteins (low-density lipoprotein, lipovitellin and phosvitin). Atomic absorption spectrometry revealed a notable amount of divalent and trivalent cations. Scanning microscopy showed that pH modifications induced the loss of granule structure by solubilization of proteins. Similar observations were made when ionic strength was increased by addition of NaCl. All results were indicative of the existence of phosphocalcic bridges between phosphate groups of the 3 proteins. AS

1912

Kwan (L), Li-Chan (E), Helbig (N) and Nakai (S). **Fractionation of water-soluble and -insoluble components from egg yolk with minimum use of organic solvents.** *Journal of Food Science* 56(6): 1991: 1537-1541

A process was developed to fractionate both water-soluble and water-insoluble components from egg yolk with max retention of biological and functional properties. About 60-90% of the immunological activity of yolk was recovered in a supernatent after centrifugation of yolk diluted six- to tenfold with water. The remaining yolk pellet had excellent emulsifying properties for mayonnaise preparation. It was further fractionated by deoxycholate treatment to separate triglycerides (80% recovery). Ultrafiltration of the deoxycholate supernatent yielded protein (74% recovery) in the retentate, and phospholipids and cholesterol in the permeate. Phospholipids were then purified by dichloromethane:ethanol (3:1) extraction, zinc chloride preparation and acetone washing. AS

SEAFOODS

1913

Sado (PN). **Isolation of luminescent bacteria from cooked seafood products.** *Dairy, Food and Environmental Sanitation* 11(7): 1991: 361-363

This investigation summarizes a 2 yr study of luminescent bacteria in cooked seafood products (cooked and peeled shrimp and imitation crab meat). *Photobacterium phosphoreum* and *Vibrio logei* the two luminescent bacteria have been isolated from cooked seafood products. SRA

1914

Nagashima (Y), Noguchi (T), Tanaka (M) and Hashimoto (K). **Thermal degradation of paralytic shellfish poison.** *Journal of Food Science* 56(6): 1991: 1572-1575

A mixture of gonyautoxin 2 and gonyautoxin 3 (components of paralytic shellfish poison (PSP) prepared from the toxic scallop digestive glands) dissolved in water and heated at 100, 110 and 120 C for 180 min, retained 39, 17 and < 3% respectively of initial toxicity. A mixture of gonyautoxin 1 gonyautoxin 4 was more thermolabile; it retained little toxicity when heated at 120 C for 60 min. HPLC and TLC analyses demonstrated that heating under above conditions converted PSP components into other substances. BV

Prawns

1915

Gupta (J). **Adoption of quality control measures in centralised and decentralised prawn peeling units - a comparative study.** *Fishery Technology* 29(1): 1992: 72-74

A comparative study on the infrastructural measures adopted in 150 centralised and 50 non-centralised prawn peeling units was carried out. 9 quality controls such as floor facilities, lighting and ventilation, construction and layout, facilities in surroundings, water and ice availability, sanitary facilities, tables and utensils, working facilities in peeling hall, and toilet facilities were studied. It was found that the centralised prawn peeling units had better infrastructural facilities related to quality control compared to non-centralised peeling units. Imposition of quality control measures helped considerably to improve the quality standards of peeling sheds. SRA

Shrimps

1916

Chakrabarti (R), Gupta (SS), Rao (CCP) and Basu (S). **Control of black discoloration in raw shrimps from tropical region.** *Fishery Technology* 29(1): 1992; 84-85

Headless *P. indicus*, *Penaeus monodon* and *Metananeaus monoceros* shrimps collected from local market, were dipped in 0.3, 0.4 and 0.5 sodium metabisulphite (SMS) sol. for 30 s, packed in crushed ice and stored for 5 days. The residual SO_2 in meat estimated at regular intervals showed an increase in proportion to the concn. of the dip sol.: 0.3% SMS was sufficient to control black spot in *P. monodon* and *P. indicus* during 5 day storage. A dip in 0.4% sms was needed to control black spot in *M. monoceros*. SRA

Fish

1917

Hagura (Y) and Watanabe (H). **Factors affecting separation of low-fat flesh from fatty fish by cryo-shattering.** *Journal of Food Science* 56(6): 1991; 1567-1571

1918

Basavakumar (KV), Indrani Karunasagar and Iddya Karunasagar. **Ability of fish associated bacteria to produce amines suspected to be involved in scombroid poisoning.** *Indian Journal of Microbiology* 32(1): 1992; 75-79

The ability of bacteria associated with fresh and market fish to produce histamine from histidine, cadavarine and putrescine from lysine was studied. Only Gram negative histamine formers such as *Pseudomonas*, *Vibrio*, *Moraxella* and *Proteus* were observed. It was confirmed that a number of bacteria present in fish were capable of decarboxylating histidine at refrigeration temp. Bacteria present in fish such as *Vibrio*, *Plesiomonas*, *Proteus*, *Staphylococcus*, *Micrococcus*, *Arthrobacter* and *Bacillus* can decarboxylate lysine to cadavarine. Histamine and cadavarine producing bacteria were present commonly in fish harvested near shore water, while putrescine forming bacteria were found only occasionally. Freshly harvested fish harboured a number of histidine and lysine decarboxylating bacteria. Ornithine decarboxylating ability was rarely observed in fish associated bacteria. GS

Eel

1919

Lee (H) and Tsai (S-J). **Detection of IQ-type mutagens in canned roasted eel.** *Food and Chemical Toxicology* 29(8): 1991; 517-522

Canned roasted eel exhibited the highest mutagenicity due to the formation of 2-amino-3-8-dimethylimidazo[4,5-f]quinoxaline(MeIQx) and 2-amino-3,7,8-trimethylimidazo[4,5-f]quinoxaline (7,8-DiMeIQx). HPLC analysis showed MeIQx and 7,8-DiMeIQx were 1.1 ng and 5.3 ng/g of canned roasted eel, respectively. Cooking temp. and time seemed to be the major factors affecting mutagen formation in fried eel. The type and amount of mutagenic compounds detected in canned roasted eel are likely to be correlated with the relative levels of specific free amino acids in raw eel. BV

Menhaden

1920

Rhodehamel (EJ), Solomon (HM), Lilly (TJr), Kautter (DA) and Peeler (JT). **Incidence and heat resistance of *Clostridium botulinum* type E spores in Menhaden surimi.** *Journal of Food Science* 56(6): 1991; 1562-1563, 1592

Raw Menhaden surimi (*Brevoortia tyrannus*) was examined to determine the incidence of *Clostridium botulinum* spores. Seven of 565 test portions (1.2%) were positive for type E spores. The thermal death time (TDT) tube method was used to determine the heat resistance of *C. botulinum* type E spores inoculated into the remaining 558 negative portions. Calculated mean D-values in mm were 8.66 at 73.9 C, 3.49 at 76.7 C, 2.15 at 79.4 C, and 1.22 at 82.2 C. The z-value of the phantom TDT curve was 9.78 C. The data indicate previously reported minimal time/temp. thermal processes used to set surimi gel provide an adequate margin of safety with regard to *C. botulinum* type E. AS

Rockfish

1921

Wasson (DH), Reppond (KD) and Kandianis (TM). **Antioxidants to preserve rockfish colour.** *Journal of Food Science* 56(6): 1991; 1564-1566

Thornyhead rockfish (*Sebastolobus alascanus*) were treated with antioxidants (tocopherol alone, tocopherol + ascorbic acid (TCAA), BHT, and sodium erythrobate) to preserve the red skin colour during frozen storage. TCAA treated fish at 4 months showed significantly higher red colour scores than any other treatment group, as measured using the CIE L*a*b* scale. The TCAA dip also enhanced the red colour compared to pre-treatment values. BV

Salmon

1922

Josephson (DB), Lindsay (RC) and Stuiber (DA). **Influence of maturity on the volatile aroma compounds from fresh Pacific and great lakes salmon.** *Journal of Food Science* 56(6): 1991: 1576-1579, 1585

Products

1923

Reddy (NR), Armstrong (DJ), Rhodehamel (EJ) and Kautter (DA). **Shelf-life extension and safety concerns about fresh fishery products packaged under modified atmospheres: A review.** *Journal of Food Safety* 12(2): 1992: 87-118

The potential benefits and possible safety concerns associated with modified atm. (MA) packaging which reduces the losses and extends the shelf-life of fresh seafood products are reviewed in this article. Aspects covered are MA packaging, uses of gases in MA packaging, bacterial growth inhibition and shelf-life extension by MAs, pretreatment of fishery products before vacuum and MA packaging, safety concerns and risks and the methods for minimizing or eliminating safety risks. 96 references. CSA

Crackers

1924

Yean (YS). **Acceptability of fish crackers (Keropok) made from different types of flour.** *ASEAN Food Journal* 6(3): 1991: 114-116

Malaysian fish crackers (Keropok) prepared using 6 ingredient combinations (2 types of fish, sardine (*Clupea leiogaster* and Jewish-Johnius (*pseudosciaena*) soldado Lac., and 3 types of flours (sago, tapioca and whole wheat) were evaluated. Fish crackers made from tapioca and sago flours had the highest linear expansion and were preferred by taste panelists. Wheat flour 'Keropok' has the highest protein content, lowest linear expansion and were least acceptable. Sensory characteristics were not affected by the type of fish used. BV

PROTEIN FOODS

Infant foods

1925

Singh (MN) and Mathur (BN). **Development of maternalized infant formula. Part V. Storage related physico-chemical changes.** *Indian Journal of Dairy Science* 44(10): 1991: 614-619

Various physico-chemical changes taking place in the Maternalized Infant Formula (MIF) during storage at 37 C were monitored over 12 months. Practically no changes were noted in the moisture content, pH and titratable acidity. Reflectance spectroscopy evidenced absence of any changes in the colour characteristics during the first four months of storage. Only a marginal increase in the reflectance spectra representing yellow, orange and red hues was observed at a steady rate with further storage upto 12 months. However, the product remained quite acceptable in terms of colour characteristics. Storage related changes in the reconstitution characteristics, viz. dispersibility, wettability, suitability index and flowability were only nominal, and remained within acceptable limits prescribed for spray-dried infant formulas. All the changes in the parameters effecting the reconstitution behaviour could be modelled mathematically, and could be useful to predict the storage behaviour of the product. AS

1926

Kumar (KR) and Venugopal (JS). **Moisture sorption behaviour of infant milk food formulations.** *Indian Journal of Dairy Science* 44(10): 1991: 632-638

Water vapour desorption and adsorption characteristics of spray and roller dried infant milk food formulations were determined at 27 C. The adsorption isotherms, although sigmoid in shape, indicated a smooth curve and hysterisis in the intermediate humidities. The monomolecular moisture contents at 27 C were found to be 3.1 and 2.96% respectively for spray and roller dried milk foods. Scanning electron microscopy study on the effects of water vapour adsorption on the crystallisation of amorphous lactose indicated that the globular nature of the infant milk food was gradually affected above 43% rh and crystallization was observed at higher humidities. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Beer

1927

Lommi (H), Gronqvist (A) and Pajunen (E). **Immobilized yeast reactor speeds beer production.** *Food Technology* 44(5); 1990; 128, 130, 133

This article attempts to describe the technical and economic aspects of a continuous secondary fermentation-maturation process for the production of beer based on the use of an immobilized yeast reactor system which can be completed within 2-3 h as against the beer matured in conventional lagering cellars which takes 10-14 days. CSA

Wines

1928

Davenel (A), Grenier (P), Foch (B), Bouvier (JC), Verlaque (P), Pourcin (J). **Filter, Fourier transform infrared, and areometry for following alcoholic fermentation in wines**. *Journal of Food Science* 56(6); 1991; 1635-1638

Areometry, filter near infrared spectrometry (FIR), and Fourier transform near infrared spectrometry (FTIR), have been compared for following total sugar and ethanol during fermentations. Standard errors of calibration (SEC) and prediction (SEP) have been estimated, respectively, with 4 and 2 fermentations, using as reference sugar and ethanol enzymatic analysis. With the first 4 fermentations, the least rectangles methods was applied for a more through comparison between FIR, FTIR, and areometry. FIR was more complex and more accurate than density measurement, and less complex, but as accurate as FTIR spectrometry. Small SEP can be achieved with FIR spectrometry: 2.5 g/L for total sugars and 0.15% (v/v) for ethanol. AS

Non-alcoholic beverages

1929

Crivaro (NO) and Carron (RB). **Orange cremogenate determination in non-alcoholic beverages, by quantitative micrographic analysis.** *Anales de Bromatologia* 42(1); 1990; 151-165 (Es)

A method to determine the amount of citrus peel and/or cremogenate in non-alcoholic beverages, by means of quantitative analysis, is presented, which also indirectly makes possible to know its healthy properties and regulation adjustment. This procedure may be applied to both industrial and official levels to control raw materials and final products. Statistical results are given. AS

1930

Palaniappan (S) and Sastry (SK). **Electrical conductivity of selected juices: Influences of temperature, solids content, applied voltage and particle size.** *Journal of Food Process Engineering* 14(4); 1991; 247-260

A device was developed to determine the electrical conductivities of foods under ohmic or conventional heating conditions. Orange and tomato juices (serum and various solids contents) were tested in the device. The electrical conductivity of juices increased with temp. and decreased with solids content. The temp. dependence of conductivity was linear, both under conventional and ohmic heating. Experiments on suspensions of carrot juice solids, and polystyrene spheres in sodium phosphate solution showed an increase in electrical conductivity of the suspension with decreasing particle size. AS

Fruit juices

1931

Mitchell (GE), Isaacs (AR), Williams (DJ), McLauchlan (RL), Nottingham (SM), Hammerton (K). **Low dose irradiation influence on yield and quality of fruit juice.** *Journal of Food Science* 56(6); 1991; 1628-1631

Low dose irradiation (< 600 Gy) of Granny Smith apples, Valencia oranges, and Pearlette grapes (Queensland, Australia) resulted in significant ($P < 0.05$) decrease in juice yields from apples (6.3% w/w) and grapes (4.8% w/w); and no change in juice yield from oranges ($P > 0.05$). Acceptability significantly ($P < 0.05$) decreased in orange juice after irradiation (600 Gy). Irradiation treatment caused only minimal changes in fruit juice composition. Juice from irradiated apples and oranges stored at 5 C for 8 wk showed similar results. BV

Apple juices

1932

Cliff (M), Dever (MC) and Gayton (R). **Juice extraction process and apple cultivar influences on juice properties.** *Journal of Food Science* 56(6); 1991; 1614-1617, 1627

Effects of several processing methods (oxidative, nonoxidative, diffusion extraction, enzyme liquefaction) on varietal apple juice character was examined. Analytical evaluations included titratable acidity, soluble solids, pH, phenol, suspended solids, turbidity, Hunterlab colour, organic acids and sugars and showed definite extraction process and cv differences. Sensory evaluation identified eight attributes, colour, clarity, fruity aroma, oxidized, fruity flavour, sweet, sour, astringent, as significant factors in characterizing differences among the juices. Canonical discriminant analyses (CDA) of analytical data showed correct allocation of all juices to both process type and var. CDA of sensory data, revealed a significant separation of processes but not all cvs. AS

Citrus juices

1933

Widmer (WW). **Improvement in the quantitation of limonin in citrus juice by reversed-phase high-performance liquid chromatography.** *Journal of Agricultural and Food Chemistry* 39(8): 1991; 1472-1476

A cyano stationary phase was found to have good selectivity for reversed-phase HPLC analysis of limonin in citrus juices. The cyano stationary phase is, however, susceptible to contamination by constitutents contained in citrus juices. A method is described for solid-phase extraction (SPE) of limonin from citrus juices followed by reversed-phase analysis. The method has a rapid sample preparation, does not cause premature deterioration of the analytical column, and offers an improved separation of limonin from other constituents over previously described reversed-phase methods. The SPE procedure provided 95-108% recovery and 2-4-fold concn. of limonin in extracts for increased sensitivity with UV detection at 214 nm. Limonin is extracted into 70% methanol, and extracts were stable for 30 days if kept at -4 C. Juices analyzed for limonin included white and pink grapefruit varieties, 'naval', 'Valencia', 'Hamlin', and 'sour oranges'. AS

Orange juices

1934

Castaldo (D), Lovoi (A), Quagliuolo (LServilloL), Balestrieri (C) and Giovane (A). **Orange juices and concentrates stabilization by a proteic inhibitor of pectin methylesterase.** *Journal of Food Science* 56(6): 1991; 1632-1634

A proteic inhibitor of pectin methylesterase (PME), recently discovered in kiwi, was used to stabilize cloud of orange juice concentrate with "Cut-back", 42° Brix. To conc. and pasteurized orange juice were added increasing amounts of fresh juice (12° Brix) with PME 0.8 U/mL at the fresh to pasteurized ratios 6.6 to 38%. The PME inhibitor (65% pure), from kiwi, was added at 50 mg/L. After 8 mo at 5 C samples were compared with controls containing the same amount of fresh juice with PME inhibited by pasteurization. Pasteurized samples were not different from those treated with PME inhibitor. Conversely, where PME was not inhibited, cloud stability decreased with increasing amounts of fresh juice. Use of kiwi PME inhibitor in fruit juice production has potential advantages. AS

Pineapple juices

1935

Doko (MB), Valente (M), Jacob (M) and Puech (A). **Consequences of fouling and macromolecule adsorption onto ultrafiltration membrane for pineapple juice processing.** *Journal of Food Process Engineering* 14(4): 1991: 279-289

Pineapple juice samples were ultrafiltrated using a polysulfone 10,000 mol. wt cut-off (MWCO) membrane. However, to facilitate operations, the ultrafiltration experiments were preceded by fractionation of juice samples using sequentially Microfiltration/Diafiltration and Ultrafiltration/Diafiltration with 8 µm; 0.4 µm; 0.2 µm and 0.1 µm membranes, using three specific experimental procedures. The 10,000 MWCO membrane was cleansed using a 40 C in NaOH solution for a min of 30 min., to restore optimal membrane water permeation flux. The effects of selective fractionation processes, pretreatments (using antifoaming agent, hemicellulase and ammonium sulphate saturation), on permeation rates, concn. levels, protein rejection and protein yields were determined. Water permeation fluxes, measured before and after each UF operation showed a dramatic flux drop from 313 L/hm^2 to 91 L/hm^2 within 7 successive 10,000 MWCO membrane experiments. This occurred inspite of suitable membrane washing conditions, pretreatments and selective fractionation processing of samples. The modification, mainly due to fouling, of the integrity of the 10,000 MWCO membrane relative to concn. level was investigated. AS

Tea

1936

Sud (RG) and Bhattacharjee (BK). **Seasonal variations of theaflavins, thearubigins, brightness, colour, quality and mineral composition of Kangra tea (*Camellia sinensis*).** *Indian Journal of Agricultural Sciences* 62(2): 1992: 139-143

Made tea of Kangra Valley collected from Palampur, India, on weekly intervals during 1989 (April-October) contained thearubigins 3.156 - 5.326%, theaflavins 0.110 - 0.353%, thearubigins:theaflavins ratio 10.80 - 31.51, total colour 1.02 - 2.15 and brightness 10.26 - 27.63%. Hard withering (55 - 60%) and low (< 2 C) difference between room and floor temp. during fermentation improved the total colour (1.26 - 2.15) and brightness (0.26 - 19.76%) of rainy-season tea. Rainy-season tea fetched higher price than the winter season tea during 1989 and 1990. Mineral contents in made tea were Cu 51 - 124 μg/g, Mn 534 - 763 μg/g, Zn 24 - 42 μg/g, Fe 186 - 407 μg/g, Ca 0.17 - 0.36%, K 2.49 - 2.57%, Mg 0.18 - 0.30% and P 0.22 - 0.37%. KAR

FATS AND OILS

1937

Perez-Camino (MC), Ruiz-Marquez (G), Ruiz-Mendez (MV) and Dobarganes (MC). **Lipid changes during frying of frozen prefried foods.** *Journal of Food Science* 56(6): 1991; 1644-1647, 1650

Fat absorption, lipid interchange and preferential adsorption of polar compounds on food surfaces were studied during frying and frozen prefried foods. Frozen potatoes and battered hake were fried with four frying oils. Significant differences in fat absorption due to the physical structure of foods was seen. Polar compound concn. and distributions demonstrated no preferential adsorption on food surfaces during frying of these prefried foods. From quantitation of major fatty acids, lipid interchange between frying oils and food fats could be determined. BV

1938

Satyanarayana (T) and Johri (BN). **Lipids of thermophilic moulds.** *Indian Journal of Microbiology* 32(1): 1992; 1-14

Reviews lipid categories; lipid contents; lipid distribution in the cell; composition of lipids; fatty acid profiles; degree of saturation and unsaturation in neutral and polar lipids; membrane lipids; and commercial process for lipid production from thermophilic moulds. 52 references. GS

Oils

1939

Guardiola (MF) and Escarpenter (FC). **Determination of tetrachloroethylene and trichloroethylene in food by gas chromatography - automatic injection head-space and electron capture detector.** *Grasas y Aceites* 41(1): 1990; 19-22 (Es)

This work presents the research performed about the detn. of tetrachloroethylene and trichloroethylene in the commercial oils, extending it to another kind of foods which have some industrial manufacture, such as butter, cheese, sausage and so on. The analysis is carried out by GC, head-space on capillary column and electron capture detector (ECD). It offers a relation between moisture's values of samples and the tetrachloroethylene concn. AS

1940

Sattar (A), Jan (M), Ahmad (A) and Durrani (SK). **Peroxidation and heavy metals of dry nuts oils.** *Acta Alimentaria* 19(3): 1990; 225-228

The peroxidation rate of packed almond, groundnut, pinenut and walnut oil exposed to fluorescent light ($P < 0.05$) increased significantly and the order was walnut > pinenut > groundnut > almond. Amber glass provided max protection against the photooxidation. Concn. of metals (Zn, Cu, Pb and Cd) showed marked variations (coeff. variation 35.6 - 66.1). BV

1941

Toro-Vazquez (JF). **Interactions among oil components during adsorption: Effects on carotenoids and peroxides.** *Journal of Food Science* 56(6): 1991; 1648-1650

Soybean, cottonseed, corn and squash seed oils were treated for 3 h with activated carbon (1, 2.5 and 5%) in a batch adsorption system at 50 and 90 C. Peroxides (P_a) and carotenoids (C_a) were determined after adsorption. Equations that described the P_a and C_a variability were developed through discriminatory multiple regression analysis using as independent variables chemical characteristics of the oils (iodine and saponification index, peroxides, carotenoids and free fatty acids, saturated/unsaturated fatty acids ratio), process temp. and adsorbent concn. Variables in the models explained approx. 85% and approx. 93% of the total variability observed in the P_a and C_a concn. respectively, independent of oil source. AS

Canola oils

1942

Mcmullen (LM), Hawrysh (ZJ), Lin (C) and Tokarska (B). **Ascorbyl palmitate efficacy in enhancing the accelerated storage stability of canola oil.** *Journal of Food Science* 56(6): 1991; 1651-1654, 1659

The effect of various levels of ascorbyl palmitate (AP) and of BHA/BHT on the accelerated storage stability of canola oils was determined by sensory, GLC and chemical evaluations. In Schaal oven tests (65 C, 0-16 days), chemical, GLC and trained sensory panel data indicated that 200 p.p.m. AP retarded autoxidation in stored canola oils. Monoglyceride citrate (MGC) addition to oils containing 200 p.p.m. AP did not enhance oil stability. Fluorescent light tests (7500 lux, 24 C, 0-24 h) showed that 200 p.p.m. AP, with or without MGC, had a limited effect in protecting canola oil from photooxidation. BHA/BHT, at 100 p.p.m. each, with MGC, did not improve canola oil stability. AS

Coconut oils

1943

Nanda Kumar (TB). **Coconut oil: The king of vegetable oils ?.** *Indian Coconut Journal* 22(6/7): 1991; 51-55

A general type of article wherein the qualities of coconut oil as a source of energy in human diets, its digestibility and nutritive values, the chemical and germicidal properties of coconut oil, the essential acids present in it, the protection it offers to the skin and hair, its medicinal uses and its use in heart diseases, its use in the supression of the growth of side branches and many more advantages are discussed. CSA

SPICES AND CONDIMENTS

Spices

1944

Evert Ting (WT) and Deibel (KE). **Sensitivity of *Listeria monocytogenes* to spices at two temperatures.** *Journal of Food Safety* 12(2): 1992; 129-137

Thirteen spices were screened for growth inhibition effect against *Listeria monocytogenes* at 24 C using a concn. gradient plate method. Cloves and oregano were the two most inhibitory spices with MIC values ranging from 0.5 to 0.7% (W/V). Inhibition was also detected with sage and rosemary (MIC of 0.7 to 1.0%) as well as nutmeg (MIC of 1.1 - 1.4%). Black pepper, chili, cinnamon, garlic, mustard, paprika, parsely and red pepper at a concn. up to 3.0% did not inhibit the growth of the organisms. The effect of cloves, oregano and sage on the growth and survival of *L. monocytogenes* Scott A was further tested in tryptic soy broth at both 4 and 24 C. At a concn. of 0.5 or 1.0%, cloves were bactericidal and oregano was bacteriostatic to this organism at both incubation temp. Sage at these two concn. was bactericidal at 4 C and bacteriostatic at 24 C. When tested in sterile meat slurry, a 1.0% level of either cloves or oregano had little effect on the growth of *L. monocytogenes* Scott A at 4 or 24 C. AS

SENSORY EVALUATION

1945

Martin (D). **The impact of branding and marketing on perception of sensory qualities.** *Food Science and Technology Today* 4(1): 1990; 44-49

1946

Macfie (H). **Directions for sensory and consumer research in the 1990s.** *Food Science and Technology Today* 4(1): 1990; 50-52

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Nil

BIOCHEMISTRY AND NUTRITION

1947

Southgate (D). **Dietary fibre: Changing our perception of the nutritional properties of carbohydrates.** *Food Science and Technology Today* 4(1): 1990; 23-25

1948

Conning (D). **Towards 2000: Nutrition and consumer expectations.** *Food Science and Technology Today* 4(1): 1990; 26-28

1949

Herman (S), Sediaoetama (AD), Karyadi (D) and Beynen (AC). **Influence of background composition of the diet on the lipedmic effect of fish oil vs corn oil in rats.** *Journal of Nutrition* 121(5): 1991; 622-630

Rats were fed diets containing fish oil or corn oil differing in fat, cholesterol, type of carbohydrate or protein. The background diet composition did not influence the hypotriglyceridemic effect of fish oil vs corn oil and the effect was diminished by increasing the coconut fat in the background diet at the expense of an iso energetic amount of sucrose. No cholesterol-lowering effect of fish oil vs corn oil was noticed with high cholesterol diets. Therefore the composition of the background diet should be considered while comparing the cholesterolemic effects of fish oil with other oils. SD

1950

Sarwar (G) and Brule (G). **Assessment of the uricogenic potential of processed foods based on the nature and quantity of dietary purines.** *Progress in Food and Nutrition Science* 15(3): 1991: 159-181

Among the 4 purine bases (ademine, guamine, hypoxanthine and xanthine), ademine and hypoxanthine seem to be more uricogenic than its nucleoside or nucleotide, when fed to animals, changes in the contents of purines and release of free bases occur during various cooking procedures such as stewing, roasting, boiling and broiling of meat, poultry and fish products. Hence the uricogenic potential of processed foods should be based on the nature and quantity of dietary purines. Review. 74 references. GS

1951

Roe (MA) and Faulks (RM). **Color development in a model system during frying: Role of individual amino acids and sugars.** *Journal of Food Science* 56(6): 1991: 1711-1713

The colour of fried potato products is limited by reducing sugars, but can be affected by free amino acids. Filter paper discs saturated with solutions of amino acids in combination with glucose, fructose and sucrose were fried in oil to investigate colour formation. Four phases of colour development were identified; equilibrium, lag, rapid and slow phase, corresponding to the water content of the system. Lysine, γ-aminobutyric acid and glycine produced most colour and glutamic acid least. Fry colour of glucose and fructose systems was very similar, but sucrose systems produced less colour. Glucose and fructose systems were not affected by pH changes, but there was a slight effect on sucrose systems. AS

1952

Hamada (JS). **Membrane reactor for enzymic deamidation of food proteins.** *Journal of Food Science* 56(6): 1991: 1725-1728

A soy protein hydrolysate was deamidated with peptidoglutaminase (PGase) retained within a 30kd spiral membrane. Reactor was operated at 30 C and $6.5\ L/m^2/h$ flux in recycle mode to 60% conversion, then in diafiltration mode for 2 h. Time course, predicted by a Michaelis-Menten equation integrated for mixed zero- and first-order kinetics with the corrections for the ultrafiltration (UF) interactions, matched that measured experimentally. The equation could be used to predict the potential activity and performance of PGase in UF reactors to achieve control of reactions for the optimal enzymic process. At the end of the run, 96% conversion and 99% of PGase were obtained. This method has the potential of being scaled-up for the production of enzyme-free deamidated proteins. AS

1953

Hamada (JS). **Ultrafiltration for recovery and reuse of peptidoglutaminase in protein deamidation.** *Journal of Food Science* 56(6): 1991: 1731-1734

Ultrafiltration (UF) of *Bacillus circulans* cell extract using a 100kd hollow-fiber membrane had no effect on peptidoglutaminase (PGase) activity and allowed 34 and 26% of PGases I and II to permeate. UF, with 30kd spiral membrane, slightly increased PGase activity in retentate but no activity was detected in permeate. Retentate was used to sequentially deamidate four batches of a soy protein hydrolysate at 30 C for 2 h, then PGase was recovered by UF. The 100kd membrane resulted in substantial PGase loss in sequential tests due to permeation and inactivation. A 100% conversion of 97% of PGase were obtained after tests with the 30 kd membrane. Multiple recovery and use of PGase by a suitable membrane is possible. AS

1954

Bhattacharyya (R) and Samanta (TK). **L-Lysine production by double auxotrophic and AEC resistant mutants of *Arthrobacter globiformis* TR9.** *Research and Industry, India* 37(1): 1992: 1-6

Microorganisms producing lysine in the mineral salt medium were isolated from 20 soil samples and lysine extractor (2 g/l) identified as *Arthrobacter globiformis* TR9 was selected for further study. The mineral salt medium of white was the best for lysine production. Biotin at 5 μg/l, ammonium chloride 75 mM and glucose at 5% were found to be optimum for lysine production. S-2 (aminoethyl)-L-cysteine resistant mutant, AEC 50^r 62 derived from potent methionine plus theornine double auxotroph yielded 32 g lysine per l of medium under optimal C and N sources in flask culture. GS

TOXICOLOGY

Nil

1955

Lee (H) and Tsai (S-J). **Effect of emodin on cooked-food mutagen activation.** *Food and Chemical Toxicology* 29(11); 1991; 765-770

The antimutagenic activity of herbs (*Rheum palmatum* B and *Polygonum cuspidatum* S) and **emodin** (a product of food-borne fungi and a constituent of edible and medicinal plants, *R. palmatum* B and *P. cuspidatum* S) was examined in *Salmonella typhimurium* TA98. The crude extracts and emodin induced a dose-dependent decrease in the mutagenicity of beno[a]pyrene, 2-amino-3-methylimidazo[4,5=f]quinoline(IQ) and 3-amino-1-methyl-5-H-pyrido[4,3-b]indole(Trp-P-2). Emodin also reduced the mutagenicity of IQ by direct inhibition of the hepatic microsomal activation and not by interaction with proximate metabolite of IQ and/or by modification of DNA repair processes in the bacterial cell. GS

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